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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

APRIL 1959

PAGE

Report of the Annual General Meeting 145

The Secretary's Page 161

Notes from Wisley. By N. K. GOULD. *Illustrated* . . 164

Masters Memorial Lecture, 1958: The Living Tree. Part II. By F. TUBBS, M.SC., PH.D. 167

The Place of Residual Herbicides in the Garden and Nursery. By PAUL BRACEY. *Illustrated* . . . 179

NOTES FROM FELLOWS:

Saint Fiaker. By MURRAY ADAMS-ACTON . . 183

Plants and Problems—XLVI 185

WISLEY TRIALS, 1958:

Annual Lobelias 185

Hemerocallis 187

Rhododendrons 189

Plants Rare in Cultivation 192

Book Notes 193

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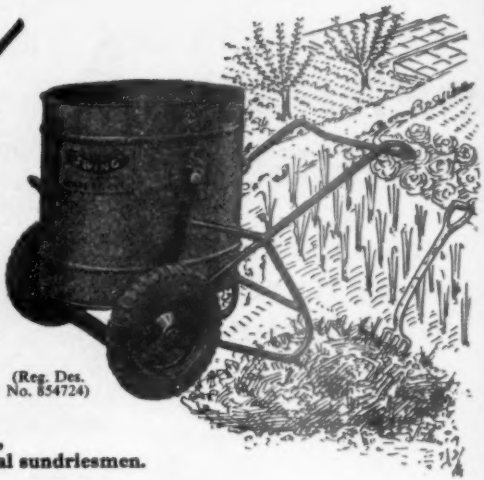

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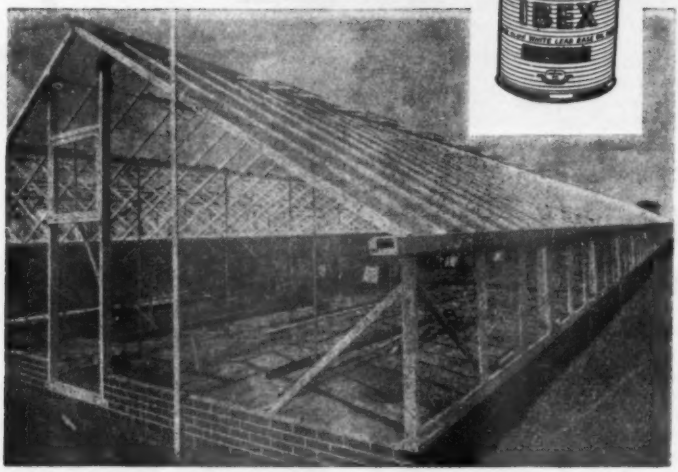

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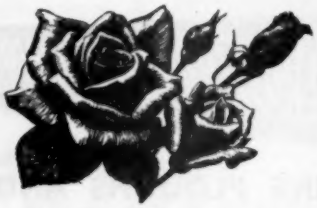

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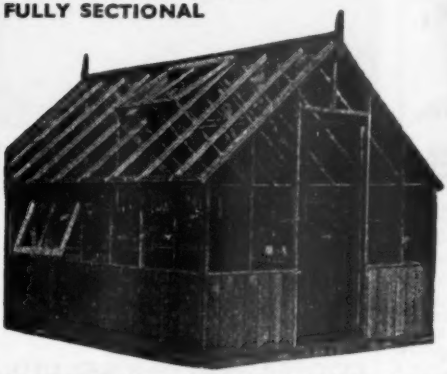

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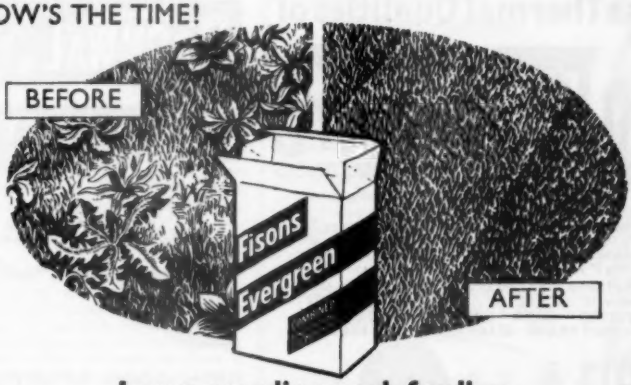

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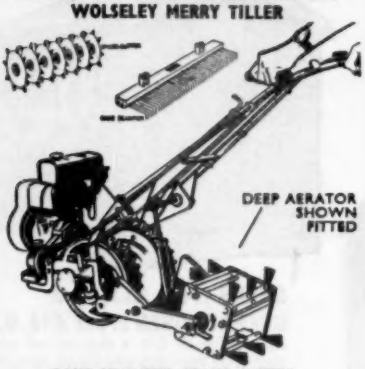

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ANNUAL GENERAL MEETING
FEBRUARY 24, 1959

REPORT OF PROCEEDINGS of the ONE HUNDRED AND FIFTY-FIFTH ANNUAL GENERAL MEETING of the Fellows of the Society, held in the Old Hall, Vincent Square, Westminster, on Tuesday, February 24, 1959, at 3 P.M.

The Hon. DAVID BOWES LYON, V.M.H., President, in the Chair.

Notice of Meeting

The SECRETARY read the Notice convening the Meeting.

Confirmation of Minutes

The Minutes of the last Annual General Meeting, which had been circulated to all Fellows in the Society's JOURNAL for April, 1958, were approved by the Meeting and signed by the President.

Report of the Council—Presidential Address

The PRESIDENT, in moving the adoption of the Report of the Council, said: Once again it is my privilege to welcome here this afternoon so many Fellows of the Society. We are very glad to see you here. I must admit I am sometimes a little surprised so many of you come, because in our April JOURNAL we have a verbatim report of this afternoon's proceedings which you can read in comfort by your firesides. Indeed, I had a letter from a Fellow whom I do not know, this week-end, apologizing for not being able to attend this afternoon's meeting, saying she is looking forward to reading my speech in the JOURNAL, and she is quite sure it will read much better than it will sound. I hastened to reply that she is quite correct.

I am very glad to be able to report once again that your Society is increasing in stature in all respects. I think all our activities are still being carried out in the usual high standard, and perhaps the best evidence of the prosperity of our Society is the fact that we still continue to grow in numbers. You will see we have added substantially to our membership in 1958, and at the end of the year we had a total numerical strength of nearly 56,000. Since then, in the few weeks of 1959, to that we have added a further 1,400 members, so you will see we are still waxing. That is satisfactory, and indeed necessary, because we do want the Society to grow. Firstly, because it is our object, the primary object of this Society, to extend the knowledge and love of gardening. Secondly, we want to increase our Fellowship subscription to meet the ever-rising costs which the Society incurs, like everybody else, in this inflationary period. The one thing I never want our Treasurer to tell me is that we cannot maintain our many activities on the highest level.

I would like to say a word about our Shows. Our Fortnightly Shows during the past year have maintained their usual top standards. I do not think any city or country in the world can boast that it holds a first-class flower show every fortnight in the year; but we would like to see more people come and enjoy these shows. There is always much

to be admired, and much to be learned from them. Fellows would do their friends and the Society a good turn by recommending them to come to our Shows, where they will find exhibitors showing splendid plants of all kinds throughout the year, and always willing to impart their knowledge about them. More visitors would encourage the regular exhibitors and others to stage displays at Vincent Square throughout the year. It is discouraging if people take a lot of trouble to bring up good plants, and then to find the attendance is disappointingly small.

Chelsea, on the other hand, never requires any more attendance. It is an extraordinary thing, we always choose our Chelsea dates a long way ahead, and quite often later on other people try and superimpose their dates on ours. Even in the last few years, on one occasion the people down at Epsom decided to run the Derby on a Chelsea Show day; on another occasion the people at Westminster here decided to have a General Election, and last year the bus drivers decided to strike in the Chelsea week. But none of those things had more than a small effect on the attendance at Chelsea. Indeed, even with no buses last year, the reduction in the number of people was quite negligible.

At Wisley we continue to make a number of improvements year by year. We have continued our policy of reconditioning our houses, as I told you last year, and we are well on the way towards completing this programme. We have done a certain amount of structural work on our buildings which I think will result in economy and efficiency.

One thing which will be of interest to many of our Fellows: we are going to create a small Model Vegetable Garden right in the middle of the gardens. It will be in preparation most of this summer, but I hope next year this small Kitchen Garden will be in full production, and will show our Fellows and visitors how to grow not only many of the more common vegetables, but a lot of the less common kinds as well, the right way, from seed to harvest. I think that will be an interesting introduction, and I hope the Fellows will welcome this innovation.

Our Publications Department have had a very busy year. We have published a serious work, the *Revision of the Genus Camellia*, by Mr. J. R. Sealy. This I think will prove the standard work on Camellias for a very long time to come. It is not a book for every man, but it is rather a book for the expert. It is being received very well throughout the world, especially in America, and I think it is a book well worth publishing.

We have also published a new International Register of Rhododendrons, which has been compiled by Dr. H. R. Fletcher. This is a very substantial work, and will be the bible of all rhododendron experts throughout the world, and I think it will be a very important book for anybody interested in that plant.

On the lighter side, at last, our co-operation with Penguin Books is in full swing. Two have now been published: one on Roses and one on Annuals and Biennials. The one on Roses came out early last year

with an initial edition of 40,000, which was easily sold out before the end of the year. So, as you will see, I hope, these Penguin Books will seep into hundreds of people's homes, and so spread the love of gardening.

I also told you last year that we decided to institute a Long-Service Medal for Horticulture. That has been accomplished. The first Medals have now been dispatched or presented throughout the country: 201 people have received this award: three of whom are women. No fewer than thirteen of the recipients of this Long-Service Medal show that they have been in the service of one family or one establishment for over sixty years. (*Applause*).

I often feel that this great gardening country all too rarely shows its horticultural achievements outside our own island. Five years ago we did venture forth to Belgium and put up a British exhibit at the Ghent Quinquennial Show. It received very favourable comment and I think it did good, and gave us a lot of goodwill. Since then we have created a British Overseas Flower Show Committee, which will consider any big International Shows which may arise from time to time on the Continent.

Now we are immediately preoccupied with preparing a large exhibit at an immense Show which is being held in Paris next April, the *Floralies Internationales de Paris*. The British exhibit is going to cover a very wide field, from hardy shrubs and herbaceous plants, to stove plants, a large number of orchids, and a great number of plants from seeds. In fact, in some ways it will be a very small Chelsea.

We have had the most remarkable support volunteered from people all over the country, both private gardeners, nurserymen and seedsmen, and we in the Society have lent our Curator, Mr. Hanger, to be Executive Officer to this British Committee to assemble and stage this big exhibit in Paris next April. I hope you will agree this is something well worth doing from the British point of view, and I have no doubt we shall acquit ourselves quite favourably in what we do there. (*Applause.*)

The only other thing I would like to say, talking of the future, is that this July we hold another Lily Conference. The last was held in 1933, twenty-five years ago. We have delegates coming from all over the world. I am sure it will be an extremely useful Conference, because much has happened in the Lily world in these intervening years, and the result of this Conference will surely help all those who like to grow Lilies.

Next year we also hold an International Orchid Conference here, which will be very well attended, particularly from America; so we are, I think, holding our own in the international field of horticulture as well as at home.

Now all this of course means more and more work for the Society, and I would like to pay a tribute to our permanent staff here who shoulder all this extra work which keeps coming to them year by year. I would particularly mention our two chief executives, Mr. A. Simmonds, our Secretary, at Vincent Square, and Mr. F. P. Knight,

our Director at Wisley. They are both most able and responsible chief executives. If it were not for them we could not carry out all our arrangements (*Applause*) so I am glad you have acclaimed the tribute I wanted to pay them.

I would also like to pay a tribute to what I call our voluntary staff, that is, all those countless gardeners who of their own free will come here, giving of their time, to sit on the Council or our Committees, to judge, to lecture, and to help in our examinations. I think it really shows what a wonderful spirit there is in horticulture in this country that this great body of men and women come from far and wide to help us in our work.

I now formally move "that the Report and Accounts of the Society be adopted", and I will ask Mr. Palmer, the Treasurer, to second that.

The TREASURER the Hon. Lewis Palmer said: I always think the Treasurer's task at this meeting is rather an invidious one, because he has to follow up the very interesting and sometimes thrilling remarks of the President with a series of extremely dry, dull and uninteresting figures. Still, you have on previous occasions borne with me, and I will try to reciprocate today by making my remarks as brief as possible.

The past year has been a very humdrum one as far as the finances of the Society are concerned; that is not to say the figures of our expenditure have remained steady. That indeed would be a sensational event, but the figures of our income have increased almost exactly to balance the figure of our expenditure. I am therefore able to report that the Accounts this year show no appreciable difference from the Accounts last year.

I have no doubt you all have your copies of the Accounts in front of you, so if you will turn to the General Revenue and Expenditure Account on page 65 of the Annual Report you will see that our Revenue from Subscriptions rose by nearly £6,000 last year, which reflects an increase in membership of the Society. But for the splendid way in which our Fellows have supported us by persuading their friends to join the Society, we should have had great difficulty in keeping abreast of the rising cost of all our activities. I hope you will take the President's words to heart today, and all of you make a resolution to persuade at least one friend, who is not a member of the Society, to join it during the course of this year.

Income from Investments rose a little, and against this our Revenue from Letting of these Halls was a little bit down.

The Total Revenue for the Year came to £162,467, which was an increase over last year of £4,835.

On the Expenditure side, on page 64, you will see there is a moderate increase in Establishment Charges; the net cost of Wisley came out in that account at almost exactly the same as last year, but that, as I will explain later on when we come to the Wisley account, is rather a misleading figure.

Our Publications cost was up by no less than £7,000, but of this

£6,000 was incurred on the publication of the JOURNAL, and of that £6,000 a very large proportion was due to the fact that the Postmaster-General had put up the postage charges as from the end of 1957. To offset this there has been a saving of some £2,000 in our expenditure on Shows, which is entirely due really to the smaller expenditure on the Chelsea showground this year.

Over the page we come to the Allocations. The first one is the usual apportionment to the Sinking Fund on the Old Hall here and the New Hall, and then you will see we have again placed the sum of £2,000 to the Supplementary Pension Reserve. As the President explained to you last year, this Fund is to make provision for supplementing the pensions of those members of our staff who, either because of illness or because of inflation, find that the pensions which come to them under our ordinary Pensions Scheme are insufficient for their needs. I feel sure you will have every sympathy with our putting away a certain amount of money, when we can afford it, to this object.

Then we come to the allocations to the Maintenance Funds for London and Wisley. The purpose of these funds is to even out from year to year the amounts spent on major improvements and repairs. Actually the past year has been rather an expensive one. We have renewed the boilers at Wisley, and we had to do quite a lot to the New Hall, so you will see the amount we have put back this year was actually rather less than we spent during the year.

After that we are left with a balance of £5,683, which is carried to the General Reserve Fund.

We now come to the Wisley Gardens Account, page 68. The total cost of running Wisley has risen by £3,700 in the year, but against this, revenue from Miscellaneous Receipts, mainly from gate takings, has risen by £1,000, and Sales of Fruit have brought in £700 more. There is also an item of £2,171 for Supplementary Grants from the Ministry of Agriculture. That is one of those windfalls that Government Departments occasionally give to you—but they do not come very often—and we cannot expect it again. It is due to some money being spent on behalf of the Ministry during the years 1946-56 in conducting the National Fruit Trials, which at first they said they were not liable to pay. I am glad they have at last had second thoughts, but owing to that the result this year is to balance almost exactly the increase in the cost of maintaining Wisley, so that the net cost carried to the General Revenue Account, which we have just been looking at, is actually £101 less than in 1957, although Wisley actually cost more. That is what I meant when I said the net cost of Wisley appearing in our General Revenue and Expenditure Account this year was somewhat misleading.

Turning to the Balance Sheet on page 70, there are only two items to which I need draw your special attention. The first is an item of Loss on Realization of Investments, £4,559. During the year we sold a block of one of our gilt-edge securities, and invested the proceeds in another, simply a change of investment; but the security we bought was re-

deemable at a rather later date, and the exchange resulted in an increased income. As we were able to buy a rather larger amount of the new security we shall make a capital profit on the transaction in the distant future. In the meanwhile, however, since we had to sell the old security at a lower price than we paid for it, the Auditors say we should write off the difference to our General Reserve Account. That accounts for the figure of Loss on Realization of Investments.

On the other side of the Balance Sheet you will see that the Market Value of our securities, as at December 31 last, is £247,135 against £216,742, as at December 31, 1957.

In his speech last year the President referred to the heavy depreciation of our investments which was shown on last year's Balance Sheet, and said he expected that that depreciation would diminish as the Bank Rate went down. You can see that the President's prediction has come true, and the Depreciation of £57,000 last year has been reduced to one of £28,000 this year. This figure of £28,000 includes the Depreciation on the Investments in the Wisley Gardens Trust Fund, on page 74. This is in case you are trying to do the sum yourselves from the Balance Sheet.

Now, I thank you, Ladies and Gentlemen, for having borne with me so long in this very tedious account of our finances, but I am glad that so far it has been my good fortune to render you a good report. I can only hope that should it ever be my misfortune to render a gloomy one, you would be equally forbearing with me.

Mr. President, I have great pleasure in seconding the resolution.

The PRESIDENT: The resolution for the adoption of the Report has been moved and seconded. Before I put it to the meeting, does anybody wish to ask a question?

Mr. H. A. GRAY: Mr. President, has any consideration been given to holding at least one Show a year in the City of London? I ask because I am keenly interested in knowing that our Society gains more Fellows. I think we have a sufficient number of gardeners within the square mile of the City to warrant having a Show at least once a year in the City. It is difficult for a number of us to come here to a Fortnightly Show because of the time limit of 5 o'clock or 6 o'clock; it is all right at weekends, but not mid-week. If we could have at least one Show there, I think it would give an impetus to gaining more membership still and more revenue to the Society.

The PRESIDENT: As regards your question, Sir, we will certainly consider your proposal.

We did try, two years ago, to give people, such as gardeners in the square mile, a chance to come here, by keeping a Show open later in the evening. It did not seem to have much effect; people did not come. However, we will certainly consider whether there is any possible means of doing as you say, but do not forget there are already a number of very good Shows held in the City of London throughout the year.

A FELLOW: The present system of entry and exit at the Chelsea Show entails a long and tiring walk from near the Chelsea Barracks, and would it not be better to have several gates?

The PRESIDENT: There is always the problem of the crowds at the entrance gates, and the Secretary has made a study of this problem of getting in and out. Although I agree it is a long way to walk under the new conditions, it has caused those troublesome queues almost to disappear. I believe on balance it is proving the best way of doing it.

If there are no other questions, I will put the Resolution to the meeting.

(*The motion for the adoption of the Report was carried unanimously.*)

Election of the President for 1959

Mr. E. P. F. SUTTON: I have the greatest pleasure to announce, and you will be pleased to hear, that only one name has been put forward for the office of President, and therefore, under Bye-law 69, the Honourable David Bowes Lyon is our President for the ensuing year. (*Applause.*) At our Annual General Meeting last year I had the privilege of making a similar announcement. We can now look back over the past twelve months, and I am sure you will join with me in thanking our President for all he has done for us as Fellows of this great Society during that year. We now look forward to another year under your presidency, Sir, with the greatest pleasure and the fullest confidence. May I say, and I am sure here again I am voicing the feelings of every one of us, not only here, but all our Fellows, that we hope for many many years you may hold this office, Sir, and be given health and strength. (*Applause.*)

The PRESIDENT: Mr. Sutton, Ladies and Gentlemen, I feel extremely flattered at the way you have accepted the nomination of the presidency for the forthcoming year. In other words, you are going to bear with me for another twelve months. But I do assure you that I recognize the responsibility which is attached to the office of President of this great national institution, and I assure you that so long as I serve in this Chair I will try and serve you and this great Society as well as I possibly can. (*Applause.*)

Election of Vice-Presidents

The PRESIDENT: In accordance with Bye-law 69, I have to announce that the following are duly elected as Vice-Presidents:

Mr. S. G. A. Doorenbos, Sir Ronald G. Hatton, Mr. G. W. Leak, Mr. F. Cleveland Morgan, Mr. B. Y. Morrison, Sir Edward Salisbury, and Monsieur Roger de Vilmorin.

I would just like to inform the Fellows that there are two new Vice-Presidents.

Mr. Doorenbos, as many of you will know, is a great Dutch horticulturist who was responsible for the parks and gardens at The Hague for a great many years.

Monsieur Roger de Vilmorin's name is a household word. He and his brother not only run a great business in Paris, but are great upholders of horticulture in all its branches in France.

Election of Treasurer, Members of Council, and Auditor

The PRESIDENT: I have to declare that, as the number of nominations did not exceed the number of vacancies, under Bye-laws 67 and 69, the following are duly elected:

As Treasurer:	The Hon. Lewis Palmer.
As Members of Council:	Mr. H. G. Hillier, Mr. S. Ogg, Sir Frederick Stern.
As Auditor:	Mr. F. G. Feather.

The Members of Council just named take the place of three retiring Members of Council who have served their five years—Mr. Sutton, Lord Digby and Sir Giles Loder. I would like to say how much we are indebted to all three for their labours during these five years on Council and on many Committees.

Resolution re Competitions

The SECRETARY: I have to report that the following Resolution, proposed by Mr. Philip Harben, has been circulated:

> "That as edible fruits and vegetables are grown for human consumption, the Council consider the advisability of instructing the judges of competitions that, in assessing the merits of fruits and vegetables, first consideration be given to the edible and (where applicable) the culinary qualities of the exhibits."

Mr. PHILIP HARBEN: I am widely assured that it is not necessary for judges to taste fruit and vegetables, inasmuch as they can tell what they taste like without tasting them. It is only considered necessary to taste a fruit or vegetable when deciding on the desirability of a new variety; once having been decided for that purpose, it need never be tasted again.

These statements are demonstrably and manifestly untrue.

I am told all Cox's Orange Pippins taste exactly alike. That is not so. I have tasted many Cox's Orange Pippins; some were good, some were very good, and some were blooming marvels.

I once discussed this matter with the organizer of a large horticultural show in North London, and I was invited to go round with the judges to see how the work was done. It was edifying: I saw a first prize given to a cucumber of most beautiful form but it tasted like turpentine; I saw a prize given to a bunch of magnificent carrots, long and straight, but they tasted of soap. I saw a prize given to some peas, beautiful plump pods with a lovely bloom on them, but they tasted of nothing at all. I saw a first prize given to some runner beans, all the same length and beautifully straight. Now cooks like their beans straight, as if they are twisted they take more time to prepare in the kitchen; but as they

will be sliced up cooks could not care less whether the beans are all the same length or not.

A number of my friends who, having paid their subscriptions, received a copy of this Agenda, expressed their astonishment that such a resolution should be put, astonishment that anyone should consider it necessary. They could hardly have been more astonished had they been told that the Hanging Committee of the Royal Academy, when deciding which pictures to put on the line, instead of looking at them were led around blindfolded, smelling them.

I have made these remarks, Sir, to support the resolution standing in my name.

Brigadier C. E. LUCAS PHILLIPS: I beg leave to second Mr. Harben's proposal. Though I was brought up to do as I was told and pay regard to my elders and betters, I am a rebel on this particular subject. When I gave up the cricket bat for the spade, a long time ago, I used to be impressed by the magnificent spectacle of vegetables seen in these Halls and other halls about the country. One day, however, like Mr. Harben, I was invited to taste some potatoes that had taken first prize at a quite important provincial Show. I tasted them, and I can assure you their flavour was mud, Shoeburyness mud, if you like, if everyone knows that particular variety.

That opened my eyes. I realized then, and have contended ever since, that visual displays of vegetables create false standards. In a Society like ours, I think we need to examine our conscience about this. We are looked up to all over the world, and all the world will agree we do a jolly good job, but I am afraid that in vegetables we follow too much the standards of the flower exhibitor; we encourage that particular kind of pride of display against which Holy Writ warns us, without, it would seem, asking ourselves the fundamental question: what is a vegetable for? Speaking horticulturally and not botanically, the purpose of a delphinium, rose, etc., is to be looked at and admired; but a vegetable does not want to be looked at; its sole aim is to be eaten. If you eat a fruit or vegetable, the thing that matters is its flavour, above all. The sweetest carrots are those the size of your little finger and a marrow is most succulent when only six inches long. Can one imagine the *chef de cuisine* of Claridges rushing out to buy the monster prize-winning leeks at Vincent Square? Would he not prefer a runner bean six inches long, instead of two feet, and a Brussels sprout the size of a walnut to one the size of a tennis ball?

I am well aware that the skilled husbandman can grow large vegetables that are sweet and luscious and I am not going to be drawn by the argument of anyone on the other side of the fence who may say a "good big 'un" will beat a "good little 'un". It seems to me our Show Committees and judges are setting false standards for the general gardener. Pride of display has become the criterion and the consequent influence is very clearly seen in any seed catalogue you care to take up; the bench has become the criterion and not the dinner-plate. I main-

tain with Mr. Harben that it should be the other way round. Under present methods you cannot really tell what a vegetable or fruit is going to taste like, especially when cooked, and what it tastes like is what really matters.

The logical deduction of all this talk is that the best judge of a vegetable is not the gardener but the cook. We should get better results from the amateur vegetable growers in this country if our judges were such people as Mr. Harben, Mrs. Constance Spry, and Mr. Ernest Marples. (*Applause.*)

Mr. HOWARD H. CRANE: I should like to ask, is the Resolution properly phrased, that "in judging competitions first consideration be given to the edible and (where applicable) the culinary qualities of the exhibits"? Surely it must be assumed that with any produce shown for competition, the merits of existing well-tried varieties must already have been properly assessed. Judges of new varieties, however, might well consider, amongst other things, edible and culinary qualities.

The PRESIDENT: The Resolution has been proposed, seconded, supported, and criticized.

I would prefer to leave the Resolution as it stands at the moment, if you agree.

I am sure you will all agree on one thing: that it is most important that fruits and vegetables should taste good and be good to eat. Therefore the Council accepts, and I hope you will accept, that Resolution as it stands, and we will go forward from that point. Is that agreeable? (*Applause.*)

(*The Resolution was adopted.*)

Presentation of Annual Awards

The PRESIDENT then presented the following awards:—

The Victoria Medal of Honour—Awarded to British Horticulturists, resident in the United Kingdom, whom the Council consider deserving of special honour at the hands of the Society.

To Lord DIGBY.

THE PRESIDENT: Lord Digby we all know as an expert gardener and a wonderful supporter of all our activities in the Society. He is an expert on rhododendrons and on orchids, and, as his buttonhole reveals, on carnations as well.

To Mr. F. P. KNIGHT.

The PRESIDENT: Mr. Knight, you have many distinctions in horticulture; one special one was that you spent your early life both at Edinburgh and at Kew, and that is afforded to very few people. You were also in the commercial side of horticulture, and you have contributed much to the knowledge of the growing of shrubs and difficult plants. Indeed, one of your books on the propagation of shrubs is still a reliable text book today.

Only four or five years ago Mr. Knight joined us as Director of Wisley, and none of us has ever regretted that for a moment. I am delighted to hand him the highest honour we can give, the V.M.H.

To Mr. BERTRAM PARK.

The PRESIDENT: Mr. Park, you have been recognized for many years, not only at home, but all over the Continent, as a very great rosarian. Further, you have published a book of a most comprehensive nature about roses, which I am sure most of us have read. It is a most admirable book which tells us how to grow them, and what not to grow, and how to deal with the pests, and everything else. A wonderful book, which has achieved great sales overseas and in this country.

For all you have done for roses, and as a great rosarian, we are glad to give you the V.M.H.

To Mr. ROBERT SCARLETT.

The PRESIDENT: Mr. Scarlett, it is a pleasure to see someone from Edinburgh. The Society is delighted to present to you the highest honour it can for the immense contribution you have made to the commercial side of horticulture in Scotland and indeed, elsewhere, for a very long time. The advances you have made on this side of horticulture are many and substantial. But, I am told, on the highest authority, that you allow thistles to grow on your farm, and further that some of those thistles have even decorated Holyrood House.

To Mr. A. G. VINTEN.

The PRESIDENT: Mr. Vinten, whoever grows chrysanthemums knows the name "Balcombe", because it is from there so many novelties have emerged.

You have achieved great success in raising these fine varieties of chrysanthemum, and I am told you still go to the nursery every day. Believe it or not, Ladies and Gentlemen, Mr. Vinten is in his 88th year. (*Applause.*) I hope you will continue in good health for many years to come, to enjoy the V.M.H.

The Associateship of Honour—Conferred on persons of British nationality who have rendered distinguished service to Horticulture in the course of their employment.

On Mr. P. CONN.

The PRESIDENT: Mr. Conn started his career at Borde Hill, then went to Kew, then to the municipal side of horticulture. Mr. Conn for the last twelve years or more has been at Liverpool, and in that period, among other achievements, has built up a wonderful collection of stove-house plants. He has promised us quite a few to take to Paris this coming April.

On Mr. R. A. J. HOLDER.

The PRESIDENT: We are glad your health has allowed you to come up today. We are delighted to give you this Associateship of Honour.

Mr. Holder came to Wisley at an age when most people think of retiring and to witness what he has done for us there is our Rock Garden, for which he is responsible, and a wonderful thing it is. I have very great pleasure in presenting this award.

On Mr. J. JOHNSON.

The PRESIDENT: Mr. Johnson is in charge of the gardens and horticultural training scheme at Dartington Hall.

On Mr. H. PARSONS.

The PRESIDENT: Mr. Parsons started life at Wakehurst with one of my predecessors, Lord Wakehurst, some years ago and then had the distinction of being appointed head gardener at Sandringham. In spite of that responsibility you find time to make contributions to our gardening periodicals. I have much pleasure in presenting you with this award.

On Mr. S. A. PEARCE.

The PRESIDENT: Mr. Pearce, you have been for twenty-one years Assistant Curator at Kew, dealing with the arboretum and a lot of other duties. We are delighted to present you with the Associateship of Honour.

On Mr. B. REEVES.

The PRESIDENT: Mr. Reeves, you have been most of your life at Wallace's, and have been largely responsible for many of those beautiful plants we see in the Shows and at Chelsea, particularly lilies.

I have much pleasure in presenting you with the Associateship of Honour.

The Veitch Memorial Medal—Awarded to those who have helped in the advancement and improvement of the science and practice of horticulture.

To Mr. A. A. CLUCAS: Gold Medal for his services to horticulture in raising improved varieties of vegetables.

The PRESIDENT: Mr. Clucas, you have lived your life amongst vegetables which cook well and taste good. Your task has been to improve vegetables, and that you have done with conspicuous success. Therefore it is with great pleasure I present you with this Gold Medal.

To Professor J. R. MATTHEWS: Gold Medal for his services to horticulture.

The SECRETARY: Unfortunately, Professor Matthews is unwell, and his doctor will not allow him to come and collect this high award.

To Mr. J. M. S. POTTER: Gold Medal for his services to horticulture in connection with the National Fruit Trials.

The PRESIDENT: We employed Mr. Potter for ten years at Wisley, and great work he did in charge of the National Fruit Trials. He has now moved to Brogdale, where they are continuing that work.

To Mr. J. R. SEALY: Silver Medal and £25 for his *Revision of the Genus Camellia.*

The PRESIDENT: Mr. Sealy is one of the gentlemen who lives in the mysteries of the Kew Herbarium, but even so, after office hours, he has done the great work to which I referred earlier, the new standard work on the genus *Camellia.* Therefore it is with great pleasure I hand him the Silver Medal and £25 award.

The Loder Rhododendron Cup—Awarded for work in connection with rhododendrons.

To Dr. H. R. FLETCHER.

The PRESIDENT: It is very nice to find another person from Edinburgh today, and it is not the first time he has been here to receive a distinction from the Society.

This Cup is very often given for the growing of rhododendrons. This time it goes to Dr. Fletcher for the work he has just completed, the new International Rhododendron Register. You who have got it know the very great deal of work which it has involved. Therefore I have very great pleasure in presenting this Cup.

The A. J. Waley Medal—Awarded to a working gardener who has helped in the cultivation of rhododendrons.

To Mr. E. E. KEMP.

The PRESIDENT: Another visitor from Edinburgh. Mr. Kemp, as opposed to the last award, this is for good cultivation of rhododendrons. You at Edinburgh grow a remarkable variety of rhododendrons even in that difficult climate, and those for which the climate is too severe you successfully grow at Benmore.

The Lawrence Medal—Awarded for the best exhibit shown to the Society during the year.

Also *the Holford Medal*—Awarded for the best exhibit of plants and/or flowers shown by an amateur during the year, in the Society's Halls.

The PRESIDENT: Both these awards go to THE CROWN ESTATE COMMISSIONERS, Windsor Great Park, for the same exhibit, namely a group of Foliage and Berrying Trees and Shrubs on October 28 (Figs. 52 and 53).

Unfortunately both Sir Eric Savill and Mr. Findlay are victims of influenza and unable to be here today.

The Williams Memorial Medal—Awarded for the best group of plants and/or cut blooms of one genus which show excellence in cultivation.

To Mr. MAURICE MASON, for an exhibit of *Begonia* species at Chelsea Show.

The PRESIDENT: Mr. Mason is rather an exception to the rule; he is first and foremost a farmer, and generally farmers are not gardeners;

generally it is the farmer's wife who is the gardener. In this case, he is both, and he exhibits the most remarkable plants from time to time in our Shows. He is getting this award for a wonderful collection of begonias he showed last year. He told me privately he grows them under the staging of his greenhouse, where you and I grow rhubarb or seakale. They are most remarkable begonias, some of which are also going to Paris this year, and so it gives me great pleasure to present this award.

The Reginald Cory Memorial Cup—Awarded with the view of encouraging the production of hardy hybrids of garden origin to the raiser of a plant which is the result of an intentional cross.

To Mr. F. E. W. HANGER, for Rhododendron 'Beefeater'.

The PRESIDENT: Mr. Hanger, you are a great marriage-maker amongst rhododendrons, and your marriages have created some wonderful progeny. 'Beefeater' is a beautiful plant, and I have much pleasure in presenting you with this Cup.

The Sander Medal—Awarded to the exhibitor of the best new greenhouse plant of general utility shown to the Society during the year.

To Mr. H. W. B. SCHRODER, for Cymbidium (La Belle g.) 'Dell Park'.

The PRESIDENT: Mr. Schroder, the experts tell me this particular cymbidium is one of the best things that has happened for a long time; but what, also, you nearly always do for us year by year is to give us immense pleasure by bringing up to this Hall some of your unique collection of cymbidiums. They are a wonderful sight and an education to orchid enthusiasts. I have very much pleasure in giving you this award for Cymbidium (La Belle g.) 'Dell Park'.

The George Moore Medal—Awarded for the new cypripedium shown to the Society during the year which shows the greatest improvement on those of the same or similar parentage.

To Messrs. R. & E. RATCLIFFE for Cypripedium (Challow g.) 'Chilton'.

The PRESIDENT: Mr. Ratcliffe, the experts tell me it was a good cypripedium. I wonder whether it was any better than some of the plants in your exhibit here today. You are a wonderful raiser of these cypripediums and I have much pleasure in presenting you with this medal.

The George Monro Memorial Cup—Awarded for the best exhibit of vegetables shown by an amateur during the year.

To Col. E. J. S. WARD, for an exhibit of vegetables on October 28.

The PRESIDENT: Colonel Ward, you must be getting rather familiar with the look of this Cup, but I hope you will go on winning it, because we do enjoy that remarkable exhibit you always give us. It is an

education to us, and I am sure, as I have said before, if we were to dissect every root it would taste as good as it looks (Fig. 61).

The Gordon-Lennox Cup—Awarded for the best exhibit of fruit shown by an amateur during the year.

To ST. JOHN'S COLLEGE, CAMBRIDGE, for an exhibit of apples, pears and grapes on November 25.

The PRESIDENT: Sir James Wordie, it is a great pleasure to me to present this Cup to the College, and to ask you to be so good as to pass on the Council's congratulations to Mr. Thoday, who is so largely responsible for growing these fruits. Mr. Thoday has staged some wonderful exhibits from your College gardens. I am told he is retiring shortly, but I hope that although your garden may be the loser, we shall see more of him here.

Vote of Thanks to the Chairman

Mr. F. R. MCQUOWN: One of the pleasures of a pleasant meeting is to propose a vote of thanks to our Chairman, the President, not only for the way he has conducted the meeting this afternoon. It would take a very long time indeed to enumerate all he does for us. I do not think some of us quite realize the amount of work he puts into that office. It is true that he has willing and able helpers, but there is some work of a character that only he can do as our President. I think the witness to his success is shown in the way the affairs of the Society flourish under his leadership. Among the great attributes of our Chairman is his cheerfulness and good humour, and, by no means least, the tact with which he carries out the duties of his office.

We all of us here share a great privilege in being members of this Society, which is one which has great influence far beyond the shores of these islands. Mr. President, we all want you to know how proud we are that you will be looking after our fortunes in the coming year, and how secure we feel that everything is in such capable hands. I have great pleasure in proposing a most hearty vote of thanks to our Chairman, the President.

Mr. GEORGE BARR: It is with great pleasure and my great privilege to second the vote of thanks to such an able Chairman as our President.

(*The motion was carried with acclamation.*)

The PRESIDENT: Mr. McQuown and Mr. Barr, Ladies and Gentlemen, I thank you very much for the kind words you used in proposing this vote of thanks and the way you received the motion. It is full of flattery, and I can take any amount of it.

The meeting has been long, and your patience wonderful, so this closes the proceedings until this time next year.

Thank you for your attendance.

(*The Meeting then terminated.*)

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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THE SECRETARY'S PAGE

ANNOUNCEMENTS—APRIL AND MAY

Shows

TUESDAY, April 7 12 NOON to 6 P.M. WEDNESDAY, April 8 10 A.M. to 5 P.M.	Fortnightly Flower Show and Camellia Competition, in the New Hall.
TUESDAY, April 14 12.30 P.M. to 6 P.M. WEDNESDAY, April 15 10 A.M. to 5 P.M.	Daffodil Show, in the New Hall. Alpine Garden Society's Show, in the Old Hall.
TUESDAY, April 21 12 NOON to 6 P.M. WEDNESDAY, April 22 10 A.M. to 5 P.M.	Fortnightly Flower Show, in the New Hall.
TUESDAY, May 5 12.30 P.M. to 6 P.M. WEDNESDAY, May 6 10 A.M. to 5 P.M.	Fortnightly Flower Show and National Rose Society's Competition, in the Old Hall. Rhododendron Show, in the New Hall. National Auricula and Primula Society's Competition (May 6 only), in a Committee Room in the New Hall.

Chelsea Show

TUESDAY, May 26—(Private View) 8.30 A.M. to 8 P.M.
WEDNESDAY, May 27—8.30 A.M. to 8 P.M.
THURSDAY, May 28—8.30 A.M. to 8 P.M.
FRIDAY, May 29—8.30 A.M. to 5 P.M.

Particulars of the availability of Fellows' and Associates' tickets are given on the tickets.

Lectures

TUESDAY, April 7, at 3 P.M. Masters Memorial Lecture: "Plants and the Weather", Part II, by PROF. J. P. HUDSON, M.B.E., G.M., M.SC., PH.D., N.D.H.

TUESDAY, April 14, at 3 P.M. "Miniature Daffodils", by MR. D. BLANCHARD.

TUESDAY, April 21, at 3 P.M. "Lilacs", by MR. F. P. KNIGHT, F.L.S., V.M.H.

TUESDAY, May 5, at 3 P.M. "Rhododendrons for full Sun", by MR. F. STREET.

Demonstrations at Wisley—The following demonstration will be given at Wisley, that on the second day being a repetition of that given on the first.

May 13–14. Summer Pruning of Shrubs. (Commencing at 2 P.M.)

Camellia Competition—The annual Camellia Competition will be held in conjunction with the Fortnightly Show on April 7 and 8. The Schedule, which may be obtained from the Secretary, is similar to that for last year's Competition but contains a new class for novices for a Camellia plant in bloom.

Rhododendron Show—The annual Rhododendron Show will be held in conjunction with the Fortnightly Show on May 5 and 6. The Schedule may be obtained on application to the Secretary.

Lily Group Meeting—The Lily Group will hold its first meeting of the year in the Lecture Room in the New Hall at 4.30 P.M. on Tuesday, April 7, when there will be a discussion on "The Genus Eremurus".

Lily Conference—A four-day Conference on Lilies, Fritillaries and Nomocharis will be held from Tuesday, July 7, to Friday, July 10. It is hoped that many Fellows and Associates will find it possible to attend and take part in the discussions. Those who hope to attend on one or more days are asked to be good enough to notify the Secretary so that adequate arrangements may be made.

Long-Service Medal—A formal presentation of Long-Service Medals by the President will be held in the Old Hall at 3 P.M. on Tuesday, April 7, the first day of the Fortnightly Show. Fellows' and Associates' tickets will admit.

Scottish Rock Garden Club's Show—The Scottish Rock Garden Club's Show will be held in the Y.M.C.A. Hall, Castle Street, Dumfries, on Wednesday and Thursday, April 1 and 2. The Joint Rock-garden Plant Committee will meet at the Show on Wednesday, April 1, and plants intended for the Committee's consideration should be entered with the Secretary of the Committee by 11 A.M.

International Orchid Conference, 1960—The Third World Orchid Conference, which is being sponsored jointly by the American Orchid Society, the British Orchid Growers' Association, and the Royal Horticultural Society, will be held in London in 1960. The first

Conference was held in St. Louis, Missouri, U.S.A., in 1954, and the second in Hawaii in 1957.

The exhibition of orchids arranged in connection with the Conference will be staged at Chelsea Show on Tuesday, Wednesday, Thursday and Friday, May 24–27, and the Conference will be held in the following week on Monday, Tuesday, Wednesday and Thursday, May 30 and 31 and June 1 and 2. It will be followed by excursions to leading orchid growers' establishments on Friday, Saturday and Sunday, June 3, 4 and 5.

A joint Committee of the three sponsoring bodies is arranging a comprehensive programme covering a wide range of subjects of interest to amateur and professional orchid growers, and well-known authorities from many countries are being invited to deliver papers on the subjects in which they have specialized.

All who are interested, and would like to have further particulars in due course, are asked to notify The Secretary, The Third World Orchid Conference, c/o The Royal Horticultural Society, Vincent Square, London, S.W.1.

Gardens Open to the Public—The List of Gardens in England and Wales opening to the public under the National Gardens Scheme in 1959 may be obtained from The Organizing Secretary, National Gardens Scheme, 57 Lower Belgrave Street, London, S.W.1, price 2*s.* 0*d.*; by post 2*s.* 6*d.*

Tour of Irish Gardens in 1959—A Tour of National Trust Gardens in Ireland, including Rowallane and Mount Stewart as well as a number of well-known gardens around Dublin, is planned from May 10 to 16, 1959. For particulars application should be made to either COMMANDER H. F. WHITE, M.B.E., The National Trust, 42 Castle Street, Belfast, or MISS CICELY HILL, Historic Homes and Gardens Tours Ltd., 39 Beauchamp Place, London, S.W.3.

Les Floralies Internationales de Paris—A great international flower show, sponsored by the Municipal Council of Paris and the National Horticultural Society of France will be held in Paris from April 24 to May 3 in a large, new exhibition building at the Place de la Défense. Arrangements are in train for the United Kingdom to be represented by three co-operative displays. For further information, including hours of opening and charges for admission, application should be made to The Secretary, Floralies Internationales de Paris, 84 Rue de Grenelle, Paris 7.

Floral Arrangement Competition for Amateurs in Paris—A Floral Arrangement Competition for Amateurs, organized by the National Horticultural Society of France, will be held in the Palais des Expositions, Rond-Point de la Défense, Paris, during the Floralies Internationales, April 24 to May 3, 1959. In a Section with Classes for miniature, medium-sized and large arrangements, all amateurs are invited to compete for the title of "Champion du Monde Amateur d'Art Floral". Full particulars may be obtained from MADAME LA

BARONNE DE WALDNER, Société Nationale d'Horticulture de France, 84 Rue de Grenelle, Paris 7.

National Floral Arrangement Competition and Luncheon—A National Floral Arrangement Competition and Luncheon, in aid of The Forces Help Society and Lord Roberts Workshops, will be held under the presidency of the HON. DAVID BOWES LYON at the Savoy Hotel, London, on Friday, May 22. Judging will be by photographs. For particulars, application should be made to The Appeals Organizer, The Forces Help Society and Lord Roberts Workshops, 35 Thurloe Street, London, S.W.7.

Rhododendrons and Lime: an Appeal—In the *Rhododendron and Camellia Year Book* for 1959 DR. HENRY TOD, of the Chemistry Department, Edinburgh, and East of Scotland College of Agriculture, 13 George Square, Edinburgh 8, described the mottling or marbling and final yellowish pallor shown on the leaves of rhododendrons growing in soil where lime is present. He drew attantion to the great difficulty of an investigation of the matter because as soon as symptoms develop in a rhododendron, the grower tends either to move it or else to modify the soil in which it is growing or, more commonly, the symptoms appear on young plants where it is almost impossible to get enough leaf material for analysis. Dr. Tod earnestly appeals to any grower of rhododendrons who is troubled with this problem to get in touch with him as soon as possible. The number of leaves required for analysis is of the order of eighty for small-sized leaves, fifty medium-sized and twenty-five large.

Gardeners' Sunday—Many gardens will be open to the public on Sunday, May 3 and Sunday, June 28 in aid of the Gardeners' Royal Benevolent Institution and the Royal Gardeners' Orphan Fund. Particulars are given in a booklet which may be obtained from The Organiser, Gardeners' Sunday, Four Winds, Seale, Farnham, Surrey, price 1s., post free.

NOTES FROM WISLEY

N. K. Gould

SPRING is with us again, at least officially, and by the time these notes are published we shall probably have enjoyed some warm and sunny days of a kind which only late March seems able to produce. On such days, mowing machines are brought from their winter quarters for the first time to tidy ragged lawns, and many other activities are undertaken to repair the ravages of winter.

As a rule, April is scarcely a week old before snow has reappeared or the wind has begun to blow steadily from the cold quarter. The severe snowstorm of Easter Eve last year put a stop to all gardening and, incidentally, upset the plans of many who had intended to visit Wisley during that week-end.

Fortunately, the cold spells of spring do not persist for long and, during April, there are sure to be plenty of fine and sunny days when a visit to Wisley will be well worth while. Among the most interesting flowers at this time are the daffodils, of which a trial of up-to-date varieties specially suitable for garden decoration is planted by the side of the path leading from the glasshouses to Seven Acres. Those which have already been approved by the Council bear upon their labels either the letters F.C.C. or A.M., indicating that they have received awards. Others, which are comparatively new to the trial, still await the judgment of the Narcissus and Tulip Committee.

Many trees and shrubs are coming into flower now and by far the most important are the rhododendrons. No other genus can compare with this in the vast number of species it has contributed to the adornment of gardens in this country, and from crosses between the species innumerable hybrids have been raised.

Many visitors will therefore turn their steps towards Battleston Hill where a great many species will be in flower as well as some of the earlier hybrids. Just over the crest of the hill on the east side of the broad grass walk, there is a long bed devoted largely to the dwarf species belonging to the Lapponicum Series, many of which are admirably adapted for use in the rock garden. Among these, we may note *R. russatum*, one of the most richly coloured with violet flowers, *R. hippophaeoides*, its erect stem clothed with grey-green leaves and tipped with clusters of lavender or mauve-coloured flowers, and *R. flavidum* which has pale yellow flowers.

Visitors who are unfamiliar with Wisley Gardens will notice that the beds in this part of the Gardens are devoted to different series of rhododendron. Each series is a group of species believed to be closely related. Some series are naturally more valuable as ornamental shrubs than others, either having larger or better coloured flowers, more elegant foliage or better habit of growth and, in a collection such as this, the visitor has an excellent opportunity to make a selection for his own garden.

Some outstanding species flowering at the present time are *R. thomsonii*, a tall bush or small tree with distinctive rounded, grey-green leaves and clusters of waxy blood-red bells which are quite spectacular when illuminated by the afternoon sun. *R. fargesii*, of more compact growth but with somewhat similar clusters of widely-flared pink flowers, is very striking, and one of the most noble in foliage and in its massive trusses of pale pink blotched flowers is *R. calophytum*.

In the wild garden, there are some earlier plantings, made over thirty years ago, of Himalayan and other species including *R. arboreum*, *R. campanulatum* and *R. wallichii*, some forms of the last two bearing flowers of a peculiar attractive bluish purple colour; and *R. niveum*, closely allied to *R. arboreum*, but having flowers of subdued purple unlike any other.

In both the wild garden and Battleston Hill there are several species of magnolia coming into flower now. *M. salicifolia* is a most valuable

plant, even for a small garden, as it rapidly develops in an erect columnar form and begins to flower while still young. Thereafter, one may expect regular and free flowering, and an established tree laden with its medium-sized pure white flowers is indeed a lovely sight. *M. kobus* is similar in many respects but usually the outer petals have a little more purple colouring at the base. The many forms of *M. soulangiana* come into flower now and some very good specimens of this hybrid can be seen bordering the lower walk of Battleston Hill, in the wild garden and in the A.G.M. collection. *M. stellata*, distinguished from the others by its rather bushy and twiggy habit as well as by its numerous narrow petals, is only represented at Wisley by young specimens, and is not very frequently seen as an old tree except in botanical gardens.

The collection of Japanese Cherries planted rather more than ten years ago in the sloping field between Battleston Hill and the main road will, it is hoped, be at the height of their beauty about the end of the month. The actual date of flowering naturally depends, to some extent, upon the weather, and in the last year or two the trees have suffered considerable damage by birds, so that it is not possible to say in advance whether they will give a good display or not. It is interesting to note that last year *Prunus conradinae* flowered magnificently before the others but that *P. yedoensis*, due a few weeks later, had practically every flower-bud stripped off by the birds.

Some colour is beginning to appear now in the rock garden where the earlier saxifragas, primulas, gentians and pulmonarias are opening. Many more interesting plants will be found in flower in the Alpine House and some of particular merit are *Lewisia tweedyi*, one of the earliest of its kind, with pink-flushed, creamy yellow flowers; *Pleione pricei*, a terrestrial orchid which is practically hardy but whose delicate purple flowers deserve the protection of the house; *Cassiope rigida* and *C. wardii*, two dainty Ericaceous shrubs bearing small white bell-like flowers; and several species of cyclamen.

We referred in these notes a year ago to the plants collected by DR. DAVIS and MR. HEDGE, in Turkey, which were being grown at Wisley. Many of these flowered during 1958 and one of the most striking was *Iris iberica* (Fig. 51), a member of the Oncocyclus section with dark chocolate-brown falls and pearly-grey standards. It is a great pity that this, and allied species of the same section, are so difficult to keep in cultivation. Although they are not really tender in the accepted sense of the word, they show a tendency to produce new leafy growths in late autumn or winter which are liable to sustain frost injury.

The visitor should not fail to walk through Seven Acres where many flowering shrubs, including species of berberis, ribes, spiraea and viburnum are blooming against a background of fresh young foliage, and the Pinetum is worth a visit now to see the many ornamental crab apples planted there.

On a wet day an enjoyable hour or two could be spent in the glass-houses. There is always something of interest to see. At the present

time one might expect to see the Bird of Paradise flower, *Strelitzia reginae*, displaying its striking orange and blue flowers, *Clianthus puniceus*, the New Zealand Parrot's-bill, with heavy clusters of blood-red flowers hanging from its branches, varieties of *Clivia miniata*, very ornamental plants with strap-shaped leaves and umbels of apricot or orange lily-like flowers, and various rhododendrons, of which the most spectacular is the hybrid *R.* 'Tyermanii', with its large, fragrant, frilled flowers.

MASTERS MEMORIAL LECTURE

THE LIVING TREE

F. R. Tubbs, M.Sc., Ph.D.

(*Lecture given on October* 28, 1958, MR. J. S. L. GILMOUR, F.L.S., V.M.H., *in the Chair*)

PART II

IN the first lecture we examined some of the concepts basic to our instinctive mental picture of a tree—its form, trunk, branches and root system, its considerable size and its perennial nature. In doing this we were brought to realize the all-pervading organization necessary to a tree's growth and continued existence and, in particular, took note of the profound effects of the root upon the top and vice versa. In the mere matter of an hour's talk, we necessarily passed over infinitely more than we had time to pause and consider. Today, rather than continue that approach, it seems better, since we are endeavouring to picture the living, growing, fruiting tree of our gardens, hedgerows and woods, to examine it from a rather different angle—from that of the tree's organization in relation to its environment.

The interrelation of environmental factors of light and temperature with growth has been described in earlier lectures by V. H. BLACKMAN in 1933 and by F. G. GREGORY in 1953, while more recent Masters Lectures have dealt with light and water supply; those interested in a fuller treatment of these subjects than is justified in today's context cannot do better than refer back to them.

The potential growth of any plant may, in a given environment, be limited by carbon dioxide supply, light, temperature, water, nitrogen supply—to name but a few of the more important factors. In comparison with an annual plant, the tree would appear to have certain real advantages, not alone through the possession of a permanent and extending structure enabling it to seek, and if necessary compete successfully for, light and water, for soil moisture and nutrients, but also through its ability to utilize stored reserves in the production, very early in the

season, of well placed absorption organs both above and below ground before the annual plant has got into its stride.

The amount of growth in mass that a tree may make is a reflection of its efficiency in assimilating carbon dioxide from the air and applying the assimilates to the production of new growth. Early German figures suggest that increase in total weight of established trees, including roots but excluding litter, may be of the same order for the broad-leaved beech as for spruce and pine—i.e. about 1½ tons per acre. In addition, the annual fall of litter was of the same order, making a total of 3 tons per acre, but it seems that these figures can be very considerably exceeded. BUSGEN and MUNCH suggest that a forest fixes about the same net amount of carbon per annum as agricultural crops in the same district. This could suggest either that an environmental factor was limiting assimilation to the same general level (assuming full cover of leaf in both forest and agricultural crops) in the examples quoted, or that the tree form possesses no great advantage save in competition and, in fact, "loses on the swings what it gains on the roundabouts". However, OVINGTON has suggested that under favourable conditions in East Anglia *Pinus sylvestris* was capable of producing 9 tons per acre, i.e. some three times the *average* dry weight increase per acre of annual crops on similar soils.

Differences in local environment have undoubted effect upon the efficiency of the tree form relative to shrubs and herbs. Thus, when we turn to the wet tropics, where the conditions of adequate light, warmth, water supply, continuing throughout the year are unusually favourable to rapid growth and, perhaps more important, to the occurrence of several such "flushes" of rapid growth every year, the dominance of tree species is, almost certainly, the result of the exclusion of other species, save epiphytes and lianes, through successful competition for light.

But when one ascends mountains in such regions, one finds a transition between high tropical rain forest and temperate rain forest; then, between the upper realms of the temperate rain forest and the grasslands or great groundsels of high elevations, an extremely interesting transitional forest formation, termed Krummholz by SCHIMPER—very effectively translated by FISHER as "elfin wood", and often known as "moss forest"—treelets with gnarled and twisted trunks, even more gnarled and twisted branches, ending in often leathery leaves but bearing all over an almost unbelievably luxurious flora of mosses and algae. Encouraged by the conditions of the "mist belt", and by the relative infrequency of those periods characteristic of lower elevations when, though water supply through the roots is adequate, the leaves on the top of the forest are exposed to full sunlight, the mosses and algae at such elevations can be said, at least in the eastern hemisphere, almost to achieve parity with the tree species!

Thus, while the tree form and size conveys a general, but far from absolute, advantage to the species and to the individual, the element of competition is never lacking. This may mean competition with others

of the same species, with other tree species, or with the lesser plants of garden and field. The simplest case is that between trees of the same age in the same plantation; here the individual surpasses its neighbour, if genetically of similar vigour, by chance advantage, in root extension and soil exploitation and resultant superiority in height, branching and competition for light. Even when the onset and severity of individual competition is severely controlled by spacing and pruning, as in fruit orchards, certain it is that the effects of these early advantages and disadvantages during the establishment of the tree are carried on and remain clearly discernible many years later. Indeed, as the individual comes into competition with its neighbours, they are liable to become steadily emphasized, save when some later accident intervenes. So important is the factor of competition between maturing trees in orchards that it is now regarded as essential for accurate experimentation so to arrange the siting of the various treatments, whether of scion variety, rootstock variety or pruning, that, by appropriate grouping or by guardrows, like shall compete with like.

Though close-planting of trees commonly results in severe competition, we must not assume that, once the trees are established, its effects are all to the bad. Take the effects of wind and exposure; the gross effects of breakage or of exposure to prevailing winds on coastal or hilly sites are well known to you, but even a single day's wind can have observable effects apart from any damage inflicted. One day in July 1956, Force 8 winds were experienced at East Malling between noon and 2 p.m., gusts of 43 m.p.h. being recorded; the wind slackened but remained strong for a further 24 hours. BARLOW and HANCOCK took the opportunity to compare the growth of apple leaves before, during, and after the gale period. They found that the effect of the gale, and in particular of the drop in temperature associated with it, was temporarily to check the growth of maturing leaves and of the youngest leaves, but permanently to restrict the size of leaves in the stage of most rapid development, i.e. of intermediate size. It is probably the cumulative effect of the greater mutual protection afforded by close planting that led to the findings of PRESTON that seven- to nine-year-old trees of 'Cox's Orange Pippin' on M. II were larger despite the fact that they also carried heavier crops where accompanied by dwarf "filler" trees on M. IX, thus reducing the spacing from $25\frac{1}{2}$ to $12\frac{3}{4}$ feet, than in an otherwise comparable orchard without "fillers".

Below the ground, ROGERS and VYVYAN have shown how, in general, root systems of trees initially well spaced tend to occupy the cubes of soil available to them, prior possession by one tree tending to reduce colonization by those of another, probably through competition for water. In older trees the situation becomes complex, as shown by the roots of sixteen-year-old 'Cox's Orange Pippin' on M. I, M. II, and on the dwarfing M. IX rootstock.

Where seedlings or younger trees are forced to develop in competition with the root systems of established trees, effective survival is

often a matter of chance development within temporarily unexploited areas of soil and the root system is correspondingly much more irregular. It would not seem that any effective antagonisms in root growth occur, for otherwise root unions between the roots of distinct trees of the same species, which are possible even in apple nursery rows 18 months old, and are far from infrequent under forest conditions, would not occur. They are well known in rubber, in alder, in *Pinus* spp., in *Thuya*, in beech, in yellow birch, maple, elm and oak: in America LA RUE lists thirty-four genera of trees in which he found root grafts, including mango, fig, orange, coffee, etc. So effective are such unions that, under forest conditions, workers studying the movement of dyes within tree trunks found that neighbouring trees of the same species frequently turned red, indicating both a downward as well as an upward movement of water in the outer wood of the injected tree trunk, and its subsequent transmission to the neighbouring root-grafted tree, wherein the dye was carried up through the wood to the leaves.

This, perhaps, is a suitable point at which to bring to mind another consequence of the tree form—trees need to transport the considerable amounts of water they absorb (in the main through the root-hairs, though a variable but small proportion may be absorbed through the older roots*) from root to leaves, together with the mineral elements necessary, just as the growth of root-tips is dependent on the transport, direct or indirect, over equivalent distances of material manufactured in the leaves. We cannot here discuss in detail questions of anatomy and function but, in general, the water of the transpiration stream moves upward in the younger and functional wood and only to lesser extent in the older rings, while the sieve tubes of the phloem lying just outside the cambium provide mechanism whereby sugars manufactured in the leaves can move downwards at considerable speed.

But it is by no means only the water and the inorganic compounds that are translocated through the wood. Two examples must suffice. In the spring the developing leaves and shoots receive the considerable amounts of hydrolysed starch required for the early and rapid development of leaves and shoots not alone through the phloem, but also to considerable extent upwards via the wood-sap. An extreme example is provided, of course, by the sugar maple.

Again, we know that nitrogen absorbed into the root as nitrates may be converted into organic form prior to translocation. A recent report by BOLLARD on the composition of sap sucked out of the vessels of the stem wood (to avoid the complications of "bleeding" a tree through heavy wounding) showed that when the apple blossoms and leafs there is a sudden rise in the nitrogen, phosphorus and magnesium content of the wood sap, and that this is maintained for several weeks. A secondary peak for nitrogen and phosphorus and the primary peak for potassium occurs eleven weeks later, the concentration falling steadily thereafter.

* In sugar maple and other trees active sap flow from the roots occurs well before bud break or new root growth commences in the spring.

Photo, N. K. Gould

FIG. 51—*Iris iberica* collected by DR. PETER DAVIS and MR. HEDGE in Turkey recently and flowering in the Alpine House of The Royal Horticultural Society's Gardens, Wisley (see p. 166)

Photo, J. E. Downward

FIG. 52—Exhibit of autumn fruits, coloured foliage and berries shown by the Crown Estate Commissioners, Windsor Great Park, October 28, 1958, for which the Lawrence Medal for the best exhibit shown to the Society during the year, and the Holford Medal for the best exhibit of plants shown by an amateur

Photo, J. E. Downward

FIG. 53—*Right-hand side of same exhibit*

FIG. 54—Statue dating from the sixteenth century of St. Fiacre, Patron Saint of gardeners (see p. 184)

Photo, J. E. Downward

FIG. 55—*Camellia japonica* 'Augusto L. Gouveia Pinto' **A.M.** April 15, 1958. Shown by THE MISSES E. and E. GODMAN. This flower is an unusual carmine colour.

FIG. 56—Daffodils on MR. F. A. SECRETT's farm near Milford, Surrey, in which the ground had been kept clean by the use of residual herbicides

Photos, J. E. Downward

FIG. 57—On this photograph the right-hand side shows a patch which has been treated by residual herbicide, while on the left, two rows which were not treated owing to a blockage in the sprayer are showing growth of weeds

Photos, J. E. Downward

FIG. 58—*Camellia reticulata* 'Paochucha' **P.C.** March 4, 1958. Shown by MRS. B. L. URQUHART. One of the fine new *reticulata* hybrids

FIG. 59—*Crocus tomasinianus* naturalized in the garden of the late MR. E. A. BOWLES at Middelton House, near Enfield. An unusually fine flowering of early crocus species has been recorded this year in a number of gardens

FIG. 60—*Mahonia acanthifolia* **F.C.C.** November 25, 1958. Shown by the Crown Estate Commissioners, Great Park, Windsor (see p. 97 of February JOURNAL)

Photos, J. E. Downward

FIG. 61—The fine exhibit of vegetables shown by COL. E. J. S. WARD, M.V.O., M.C., on October 28, 1958, for which the George Monro Memorial Cup, for the best exhibit of vegetables shown by an amateur during the year, was awarded (see p. 159)

Examples from 131 different families, including many broad-leaved species and several gymnosperms showed that the *root* is the active centre of transformation of absorbed nitrogen into organic combination, in which form it passes either directly or through a storage form to the sap in the wood. It may be that later work will show that compounds of other elements can similarly be transformed, as suggested by TUKEY's work. In other words, it appears that we should regard the root *not* as a mere absorbing organ, but as crucial a centre of combined absorption and synthesis as the leaf, connected together by two active channels of movement and transport, the phloem and the younger wood respectively.

To this day, though we have become increasingly aware of the general picture of translocation of water and elaborated materials within the tree—even to the point of repeating with aplomb experiments devised decades before—we must confess that we remain largely ignorant of how this complex mechanism really works. Certainly, we know that something akin to a highly flexible control of the permeability of the cell-walls of living cells is necessary to account for organic molecules, some of relatively large size, entering the sap stream in the young wood past normally impermeable cell surfaces, and on other occasions for starch and other reserve materials being laid down in quantity within the living cells of root, trunk and branch over and above that required for their respiration.

Another such vital control mechanism, perhaps especially located in the endodermis, which enables more concentrated solutions to be maintained within than without, has been postulated to account for the inward passage of water through the root tissues and the development of those considerable osmotic pressures within the wood vessels which result in the phenomena of "bleeding" both in trees and in herbaceous plants; the pressures are such that copious bleeding may occur in vines and in many other species, up to 50 feet high (the coconut palm is an example).* Nevertheless, it is fairly certain that "root pressure" based upon vital functions does not alone account for sap flow, for example in maples, in which it can occur without any positive root pressure being apparent, while in other plants it has been shown that water can be drawn into the plant by the leaves even through an anaesthetized or dead root. Further, some means of *maintaining* a high osmotic pressure within the root xylem must be postulated if we are to regard it as a major factor in maintaining the movement of water from root hair to transpiration stream. The facts that bleeding can be increased by auxin or decreased by poison applied to the roots, and that to stop such bleeding the osmotic pressure outside the root must be higher than that in the xylem, suggest that active root absorption is based upon *both* physical and vital processes.

DIXON pointed out that once water is being freely evaporated from the surfaces of the fully imbibed cell-walls of the leaves, *tensions* are

* i.e. under 2 atmospheres. Root pressures of up to 5 atmospheres have been reported.

set up within the water-conducting system. It is these, he suggested, which are responsible for the lifting, and for the overcoming of frictional resistance, that is involved in the supply of water to leaves at great heights. Other mechanisms have been suggested, e.g. (i) water movement through the living cells of the wood parenchyma largely by some vital mechanism, with the vessels acting as mere reservoirs and air traps, (ii) capillarity leading to water rise within the narrow vessels, (iii) passage through the walls of vessels, and (iv) reduction of pressure. Though each may play some part, clearly none is alone sufficient, for experiments with dyes and poisons have shown the limitations of (i), (ii) is insufficient by itself, as is (iv), to raise water high enough, and (iii) would not raise enough. Despite the limitations of DIXON's suggestion, which he recognized, and despite such puzzling facts that (*a*) the transpiration stream can be maintained in the trunk of an orange tree despite overlapping saw-cuts close enough to sever all vessels, (*b*) the tension system propounded by DIXON is fundamentally unstable, and (*c*) blocking of the vessels by cavitation or gas-bubble formation would appear to be irremediably cumulative, DIXON's suggestion still commends the qualified support of the majority of those who have studied this problem.

Lest we are carried away by any longing for the simple or easily understood, we should perhaps take note, on leaving this intriguing subject of the transport of water and other substances within the tree, that all these processes can, it appears, go into reverse! The tree can retrieve nitrogen, potash, etc., from an ageing leaf and either store it or translocate it up or down the stem to the developing fruit or leaves. BUSGEN refers to upward movement of organic substance in the phloem, in, for example, pear and root grafted spruce. The leaves on a fruiting branch of an orange can maintain themselves fresh by withdrawing water from the fruit. Again, as first experimentally shown by HALES in his *Vegetable Statics* (1727) and again recently by more rigorous experiment, plants can, for some time, maintain both roots and shoots by absorption of moisture through the leaves alone when there is insufficient water in the soil to maintain life!

References have already been made to the "reserves" of the tree as a factor in its growth and in its competition with its neighbours; all plants have occasional surpluses of assimilates over and above what is required for daily respiration and growth; in leaf or elsewhere for a few hours or much longer, they may be laid down in the form of starch or more complex reserves for later mobilization and transport as growth requirements demand. Trees have the characteristic, in common with perennials and biennials generally, of carrying over from season to season considerable reserves, often, as in the potato and the sago palm, in considerable excess of the minimum necessary.

The extent and duration of time over which the root draws on its local reserves for spring growth is not as yet very clear, but it may well be considerable considering that on the average half to one kilogram

dry weight of root is developed for every kilogram of top, presumably at the expense of local reserves, and that every year it is not until the leaf surface has sufficiently extended and matured to support its own respiration, that of the tree and root as a whole, its own extension growth and the development of stems, flowers and fruits, will there be any nett surplus on current account for root growth or to restore reserves used by nett growth earlier in the season. Although ASKENASY (as quoted by SCHIMPER) gives a very clear outline of the accumulation and utilization of starch reserves in the wild cherry tree (*Prunus avium*) in relation to growth and periodicity, there is much more we want to know about the extent and use of the tree's energy reserves, about the form in which they are stored additional to starch and sugars, and about the way they are associated with or influence cropping. I am glad to say that it has been found possible to take up this study at East Malling, and look forward to the results with interest.

Meantime, we know that when at leaf-fall the wild cherry has accumulated its maximum reserves for the season, they are distributed in the form of insoluble starch or soluble glucose through the bark and in the living cells in the wood (medullary rays and parenchyma) and as glucose in the wood vessels preparatory to or during transport and redistribution.

During the period between the autumnal maximum of reserves and the minimum to which they fall during the early and rapid phase of shoot extension there are very considerable changes taking place in the form and distribution of the carbohydrate reserves—changes quite sufficient to demonstrate once again that "dormancy" is a highly relative term. During the early winter a proportion of the starch is converted to soluble sugars, in which form it may well be of importance in reducing liability to frost damage to the tissues. Towards the end of winter, before bud swelling is visible, starch appears to increase for a time, only to be reconverted to glucose and transported through the vessels to the swelling buds. In these, too, there are changes; during the early winter the non-meristematic tissues, budscales and pith, are full of reserves which in late winter are moved across into the embryonic leaves and flowers, to be mobilized and consumed in the earliest stages of bud swelling and burst.

In general, it seems likely that the amount and availability of the energy reserves of the plant is a factor of no less but no greater vital importance to the tree's growth and economy than suitable temperatures, adequate light, moisture, mineral supply, etc. In other words, only when limiting are they important; this situation can arise as the result of repeated defoliation, perhaps of over-cropping, or of excessive night and soil temperatures with the resulting high respiration losses.

We know that defoliation by man, disease, or pest leads at once to marked reduction of growth and, if repeated, to the death of such trees as conifers. In general, as in prairie scrub and in raspberry, the easiest way of killing the plant is to cut it down when its reserves have been

expended on rapid growth and have not as yet been recouped by the assimilation of the fully developed leaf surface. An interesting example of a case where the energy reserves of the tree proved of high importance in dictating cultural procedures is provided by the tea tree.

In Ceylon, under high-rainfall conditions tea grows all the year round. At 4,500 feet, with a mean temperature of 65° F., if abandoned, it competes successfully with invading wild species, or, if cultivated, can be plucked and pruned while maintaining abundant reserves of starch in the roots at all times save after unusually rapid growth; not surprisingly it is this fact that enables the tea bush to withstand, every two to four years, pruning of a type that you might feel more than drastic.

At lower elevations, with more forcing climates and average temperatures of 80° F. at 200 feet above sea level, and with relatively high night and soil temperatures, the starch reserves in the roots of the tea bush are clearly more seasonal in amount; they are more obviously reduced by rapid growth, and in abandoned or neglected areas the tea bushes are rapidly suppressed by invading species. If pruned in such a way as to remove all or most of the leaves, as is common practice at high elevations, a large proportion of the pruned branches, or even whole bushes, die.

It was found that such dieback and death was markedly reduced by the presence of leaves during the period of recovery from pruning.

Further, the number and weight of new shoots was found to be strongly influenced by the amount of leaf left on the pruned bush during the recovery period and also by the length of time it was left on the bush to assist recovery.

It is probable that fluctuations in the energy reserves of the tree are also associated, not alone with vegetative growth, but also with flowering and fruiting.

We all know of apparently regular successions of good and bad crops, particularly of such apple varieties as 'Miller's Seedling' and 'Laxton's Superb' but similar fluctuations are known to occur with avocado pear, coffee, date palm, mango, olive, tung oil and many another tree and shrub. Here I am voicing a personal speculation for what it is worth; it is possible that the concept of "degree" of biennial bearing may prove to have been unfortunate to the extent that it may have distracted attention from the wider question of irregular and, especially, periodic bearing—a phenomenon widely occurring among perennial plants and, in its own right, of great scientific interest and economic importance by virtue of the light it may throw upon factors inducing *regular* bearing.

We cannot regard the matter as one of flower formation alone; in many trees far more flowers are regularly produced than are necessary to produce a full crop. For example, in "off" years of the olive both number of flowers and the percentage set is reduced while, in the pecan, flowers or fruitlets may abscind in the "off" year; whatever the physiological factors involved, it seems unwise to attribute any regular

periodicity in the numbers of fruit or flowers solely to factors affecting the initiation of flower formation.

What it is, in the development of a heavy crop of seed or fruit, that limits the capacity of the tree as a whole to repeat the process in a subsequent year is certainly partly, and almost as certainly not wholly, the reflection of conditions within the fruiting spur or branch alone. It may be that those trees which commonly bear heavily at intervals of three or more, or many, years so exhaust their reserves that more than one year is necessary to restore the tree to the point where it can respond to that second requirement for a "seed-year" in temperate trees, namely, a dry and hot late summer-condition conducive to high assimilation and low expenditure of reserves on "Lammas" growth.

We have considered the tree form, and glanced at some of the advantages it confers and at some aspects of its internal economy; to conclude, let us return to the question, mentioned in the first lecture, of the effect of soil conditions on the root system and thereby on the tree as a whole; a great amount of detailed study has been given by ROGERS and his co-workers to the root systems of fruit trees, especially of the apple. In general, fruit trees on clonal rootstocks produce a very efficient system of fairly shallow spreading "scaffold" roots 9–18 inches deep from which almost vertical sinkers descend to depths determined by conditions in the subsoil.

These sinkers are of special value in tapping the water reserves of the deeper levels of the soil; as we have noted, their extent, efficiency and importance are greatly influenced by soil conditions. The fine fibrous root grows out in all directions especially exploiting the upper and more fertile regions of soil and is usually well distributed over the area of the soil exploited. As a guide one can take it that the spread of the roots of an apple is half as big again as that of branches on the better soils (e.g. a deep loam) and up to three times the spread on poor or shallow soil. In other words, on normal good soils there is likely to be more feeding root outside than under the tree cover, and on poorer soils seven or eight times as much—a point to remember when we are watering or manuring either our trees or the neighbouring herbaceous borders!

The influence of soil conditions on the distribution of the unsuberized absorbing roots in both row and alley is well illustrated by COKER's excavations of the root systems of eight-year-old 'Wellington XXX' black-currant bushes some of which had been under straw mulch (8 tons of straw per acre in the first year and thereafter 4 tons annually) for two and a half years of the eight.

Marked effects on the distribution of absorbing roots of the freedom from drought and cultivation in the upper layers of soil under a mulch, even in so short a time, are apparent. Both the spread and size of top and the spread of the root system under mulch was increased by as much as a third in the same short period.

Further work by COKER has thrown additional light on how it is that,

given a suitable fertilizer régime and adequate control of the grass by mowing, apple trees can be grown more satisfactorily in grass sward than under arable cultivation, especially where supplies of bulk organic manures are no longer available for the latter. He excavated eight sixteen-year-old trees of 'Cox's Orange Pippin' on M. IX, four under clean cultivation and four under a succession of *Poa* plus annual weeds/meadow grass/Bent grass, mown six to nine times a year, over a period of nine years. Thus the trees had established their initial main root systems under the same conditions. The effects of seven subsequent years under grass were in many ways similar to those on black currants under mulch, for under grass in the absence of cultivation and with greater porosity and organic matter of the soil, the fine rootlets branched freely in the uppermost layers of soil despite the inevitable competition that must occur from the grass. Here frequency of mowing was a factor for, unlike the even distribution of fine root trees in clean cultivated soil, a greater proportion occurred on the periphery of the root spread with fewer close to the trunk where the grass necessarily remained uncut during the summer. The area exploited by roots under sward was some 40 per cent greater than that under clean cultivation, with a corresponding and very considerable increase in total fine roots.

DR. ROGERS, MR. COKER, DR. GREENHAM and MR. GOODE have some most intriguing models and figures of the effects upon root, top and fruit of soil types and treatments, and I am sure you join with me in gratitude to them for the very interesting demonstration now available to you, where they will be able to add to my all too inadequate account of the results of their work—work which has so great a bearing upon our understanding of growth of our trees, not alone in the orchard, but in our gardens, fields and forests.

When I accepted the privilege of delivering the Masters Lectures this year, I did so in the hope that I might succeed in giving an outline sketch of what a tree is and some indication of our increasing knowledge of the manifold complexities of its organization, growth and life. As always when one faces such issues, achievement far lags behind intention; today outstandingly so. All the same, I hope that MASTERS may feel that his life interest in the application of botanical knowledge to horticultural practice is continuing, ever more widely, among those who have succeeded him.

DISCUSSION

MR. EDLIN (Forestry Commission): I should like to say that in the Forestry Commission we are occasionally troubled with diseases travelling from one tree to another through root grafts, notably with pine. In East Anglia we get *Fomes annosus* finding its way into the stump of the tree, and turning up some few feet away in the next tree—a perfectly healthy tree, which then falls a victim to this disease. Unfortunately, the process does not stop there: it goes on from tree to tree.

We have a remedy—to apply a wood disinfectant to the stump of the first tree, and that keeps the fungus out.

I should like to ask DR. TUBBS whether similar things are found in fruit trees, and how serious they are.

DR. TUBBS: We certainly do have trouble, and on occasion serious trouble, from *Armillaria mellea*, normally starting from centres in hedgerows and reputedly also resulting from spore infections of cut stumps.

I have come across *Fomes lignosus*, in rubber and tea plants. There we did not attribute the spread from tree to tree to root grafts alone, because experience has shown us that the fungus can spread from tree to tree without an actual organic union with roots of neighbours.

The same is true of fungi like *Poria* and *Ganoderma* and other tropical root diseases of that type. We certainly get them in our tree crops, and we have not really succeeded in controlling them any better than you have. The only thing is, where the land is of very great commercial value, as in the best tea land, it sometimes pays to limit the spread of the disease by the most meticulous excavation of all root systems, leaving nothing to act as an infection base in the soil—but that would not pay under forestry conditions!

MR. MILLER: Have you any information regarding the form of the root of fruit trees which are trained as cordons?

DR. TUBBS: I think where cordons have been closely planted, as in a cordon row, we can reasonably expect something rather similar to that slide I showed with what I called the long narrow rectangles, where you had a much greater spread outwards from the row than along the row, along which the spread of the roots of an individual tree was limited by the presence of the roots of its neighbour.

I think we should remember from our first talk that pruning restricts very materially the growth of the root, and therefore any form of pruning whether it be summer or winter pruning, can be expected to limit not alone the upper portion of the tree but also the growth of the root. In general, where such pruning has induced additional fruitfulness as a competing factor in the tree's life, it may be that also checks growth of root and top. Therefore one would expect the root systems to be smaller than those of more freely trained trees.

DR. ROGERS: DR. TUBBS has said exactly what I would have said. We did in fact excavate a row of trees on M. IX which is commonly used for cordons. These were actually growing upright. That would make no difference: often they have their roots growing mainly sideways in an area of least root competition.

So you may reckon, I should say, on the soil of about 3 to 4 feet on both sides of your cordon area being full of roots, from about the fourth year onwards.

MR. MILLER: In extension of my question, perhaps I ought to explain that the trees that I have in mind are on M. IX and they are some thirty years old now. During the first four years I found the root

extension growth, as you have stated, tended to be laterally to the line of trees, and I found the roots extended to some 6 or 7 feet away.

However, nowadays, when the trees are thirty years old, they are fruiting very prolifically, but I find the roots, at any rate on the surface, are not nearly so extensvie as they were, and I am in a quandary as to why that should be.

DR. TUBBS: Are you cultivating close up to them? I assume that you are.

MR. MILLER: There are some forty trees, and the beds in which these trees are planted are used for cultivation of ordinary border plants.

DR. TUBBS: It may be that ordinary plant cultivation necessary for the borders may have cut a number of your upper roots. Cultivation reduces root spread in the upper soil. There is also the drying-out effect from competition from the flowering plants: you know how dry a border gets, and that tends to check the growth of roots in the upper levels of soil.

MR. MILLER: It had no apparent effect on the vigour of the trees, and they have a wide range of varieties, so I am still a little perplexed, but I thank you.

THE CHAIRMAN: I know DR. TUBBS does not want me to keep you long from the exhibits, to give him an elaborate vote of thanks, but we have had a fascinating two lectures ranging all over the world, and ranging through a very wide variety of trees.

I do not think any of us will look at a tree again in quite the same way, with quite the same eye; especially shall we realize that it is like an iceberg, with something rather important below, as well as above, ground.

As I said at the first lecture, or as I was reminded by DR. TUBBS, it was about thirty years ago that his predecessor, SIR RONALD HATTON, gave the Masters Memorial Lecture. Most of you who have read that, and know what has happened, will agree with me that DR. TUBBS has been a very worthy successor in the shoes of the previous Masters Memorial lecturers.

We are extremely grateful to him and his staff for giving their time —they are very busy people doing important work at the East Malling Research Station—and coming to the Royal Horticultural Society on these two afternoons to give us such an excellent and wonderful talk. Thank you very much.

THE PLACE OF RESIDUAL HERBICIDES IN THE GARDEN AND NURSERY

Paul Bracey

(*Lecture given on August* 12, 1958, MR. H. G. HILLIER, F.L.S., V.M.H., *in the Chair*)

INTRODUCTION

THE control of weeds in the garden and nursery by chemical means is possibly the last major problem to be solved in the care of plants. Small motorized cultivators can carry out inter-row cultivations effectively while soil conditions permit, but weeding in the crop rows still has to be done by hand. In recent years, chemical means of control have started to receive serious attention and some of the possibilities are discussed in this article of using compounds called residual herbicides.

TECHNIQUE OF APPLICATION

Residual herbicides are applied to bare soil as a complete cover, where they destroy weeds, as these germinate and absorb the chemical. This process epitomizes the difference of residuals from contact pre-emergence herbicides, which are non-selective plant poisons, and which are necessarily non-residual to avoid damage to the crop plants.

WORK BY OTHER BIOLOGISTS IN NURSERY STOCK

BYLTERUD in Norway worked with CMU, NPA, CIPC (naphthyl phthalamic acid), 2,4DES and MCPES on stocks 6 to 16 inches high, *Syringa reflexa*, *Buxus sempervirens*, *Sorbus intermedia*, *Acer ginnala*, *Rosa rugosa*, and *Berberis thunbergi* (all one year old), *Spiraea arguta*, *S. vanhouttei*, *Cotoneaster lucida*, *Mahonia aquifolium*, *Picea abies*, *Philadelphus*.

BYLTERUD pointed out that the separate compounds used at rates of (CMU) 4 lb. per acre, and others up to 10 lb. per acre, controlled only certain weed species, leaving some unaffected. CMU at 4 lb. per acre caused severe injury to all stocks but none of the other compounds affected the stocks except for some temporary injury by high doses of CIPC.

The herbicidal spray was applied, at various times during the spring and summer, between the rows of stocks without taking special precautions to avoid drift on to the foliage. BYLTERUD concluded that it was logical to test mixtures of 2,4DES, CIPC, etc., and he obtained excellent results with such mixtures, e.g. from 2·5 lb. 2,4DES plus 2·5 lb. CIPC per acre.

In the U.S.A., CHADWICK and BARKER used 2,4DES at 4 lb., plus 0·5 lb. CMU per acre, in *Taxus* and other conifer nursery stock with

good results. Other American workers used 2,4DES and CIPC in raspberries and strawberry plantations. ROACH has described trials he has made in England since 1953 with 2,4DES in strawberries and suggested that 5 lb. per acre might be a useful level for use at monthly intervals. Published reports from Long Ashton and East Malling Research Stations have indicated that 2,4DES at 4 or 5 lb. per acre was useful in plantations of strawberries, fruit stock (black currant, apples, etc.), for suppressing weeds.

WORK IN UNITED KINGDOM WITH COMBINATIONS OF RESIDUAL HERBICIDES

At the 1956 Weed Control Conference in Blackpool the writer presented a paper based on his experimental work suggesting ways in which 2,4DES might be useful when used alone or in combination with other chemicals for the control of weeds in the nursery and garden, and the following remarks are abstracted from that account. Compounds like TCA, monuron (CMU), fenuron (PDU), 2,4DES, CIPC and dalapon were all employed in various combinations, and since that time some of these have been put on the market under different proprietary names. Reference has been made in horticultural journals to work by the N.A.A.S. in certain crops using CIPC/PDU combinations, which are a development of this work published in 1956. It is probable that the number of combination herbicides used commercially in horticulture will increase over the next few years as our experience grows. The writer has used a rough division of seasonal activity to describe two main groups of herbicidal combinations, i.e. winter spray based on CIPC, and summer spray based on 2,4DES. This type of classification may be useful because the potency of the chemicals were found to be affected by temperature, CIPC being most effective in cold, wet soil, and 2,4DES in warm, wet soil.

NURSERY STOCKS AND HERBACEOUS PERENNIALS

By nursery stocks is meant the general range of plant species planted out for growing on before sale to the public. Our experience has agreed with that of American and Swedish workers in showing that combinations of 2,4DES with fenuron and CIPC allowed much lower weight of chemical per acre to be used than when single compounds were used. For example, from 4 to 8 lb. per acre of 2,4DES used alone, although causing no damage to the plants, gave poor weed control in *Liquidambar*, *Cornus*, *Aronia*, oak, crab, *Rosa canina*, and deciduous azalea hybrids. But the addition of 0·5 lb. fenuron to 4 lb. 2,4DES kept rose briars clean for more than six weeks. CIPC alone, even at 8 lb. per acre applied in June, gave a poor performance against groundsel, while damaging briars and other stocks.

Herbaceous plants like *Verbascum*, *Anchusa*, *Erigeron*, *Sedum*, *Paeonia*, *Scabious*, *Heliopsis*, and *Chrysanthemum maximum* were all

successfully weeded by 6 lb./acre of 2,4DES, if applied immediately after hoeing the soil, but while 4 lb. 2,4DES, plus 2 lb. CIPC, gave even better results, the plants were severely checked for some weeks before recovering. Bearded iris were also tested and not damaged by 2,4DES.

Experience so far in commercial plantations has shown that one application of a CIPC (or Winter Mixture) between October and Christmas will maintain a clean soil up to May. The addition of 5 lb. dalapon to the CIPC mixture gave a good kill of couch grass. It is not advisable to use dalapon at higher rates in nurseries until commercial experience has indicated clearly that it is safe to do so. Used alone, dalapon tends to be unreliable under certain climatic conditions.

It appears that late March or April is the time to begin application of the "Summer, or 2,4DES Mixture", after the usual spring cultivations.

The 1958 growing season was one of the wettest for fifty years, and contrasted with the dry springs experienced in previous years. In such exceptionally wet soil conditions, 2,4DES being water-soluble, is more likely to be converted within a few hours to 2,4D and carried quickly to the root zone of susceptible surface-rooting species of plants. This may cause a temporary check to growth.

Three soil sprays are the most that should be necessary in one year. There are clear indications that the autumn treatment is becoming the most important because it destroys the autumn germination of many annual weeds which would otherwise remain until the spring, ready to infest the whole plantation.

Another feature of weed control in nurseries which is emerging strongly, is the advisability of clearing perennial weeds from land *before* planting with nursery stocks which are to occupy the land for two or more years. Perhaps one of the most outstandingly successful features of the "residual" story has been in rose stocks (briars), and this crop may be used to illustrate the present suggested cycle of chemical weed control in the general nursery.

The land intended for planting rose briars in the following March may be under corn the previous summer. The writer has found that a very effective treatment is to begin, immediately after the cereal harvest, by applying on the stubble from 5 to 10 lb. dalapon, plus 2 lb. fenuron, and then leaving the stubble undisturbed for three months.

This treatment kills couch grass, most perennial weeds like creeping thistle, dandelion, bindweed, etc. Farmyard manure can be spread and ploughed in and after necessary cultivations, the briars can be planted in March or April. Before bud burst, a 2,4DES mixture has been applied as an overall spray, which has kept the soil clean for three months. Subsequent applications, if required, should be directed so as to avoid spraying the foliage directly. This means the use of a knapsack sprayer or a drop-leg boom for the mid-summer (June) spray, while the April application can be made by tractor-drawn sprayer with a 12-foot boom.

Certain other young stocks can be treated in similar fashion, e.g. quickthorn, privet, apple, pear, cherry and plum.

Couch grass is a special problem in all nurseries and is best tackled by autumn sprays on to the grass foliage of 5 lb. dalapon added to one gallon of the CIPC mixture. It is only rarely that couch is completely eradicated by a single autumn application, and this must usually be repeated the following autumn (or in exceptional cases, in the spring).

Among the very long list of shrubs which have been successfully weeded by residual herbicides, certain kinds have been damaged by 2,4DES and other mixtures. This damage has shown itself as a temporary chlorosis or yellowing of the leaf margins, or as crinkling and brittleness of the leaves.

Subjects showing leaf yellowing are *Euonymus* spp.; *Berberis wilsoni* group; all newly planted ornamental cherries, but not those planted for three years or more, *Veronica* and *Forsythia* from 3-inch pots; Myrobalan plum seedlings. The chlorosis affects the oldest leaves first and is a temporary feature.

Twisting of the shoots or leaves, or stunting of growth has been shown by *Stachyurus* spp.; *Acer negundo*, *Viburnum* spp.; *Alnus* (as one-year plants but not older). Lilac is damaged by dalapon applied in the spring. Black currants or other *Ribes* species, which are specially sensitive to hormone sprays, may be damaged temporarily if the young growth is splashed heavily with treated soil.

GARDEN CROPS

Fruits

Strawberries may be weeded by application of 2,4DES mixtures before or soon after planting. In established fruiting plantations the 2,4DES mixture is possibly most valuable when used immediately after harvest, following straw-burning and cleaning up of the plantation. This treatment should remain effective until September or October, when a CIPC mixture can be applied to control the winter weeds, and keeping the soil clean until the following spring (April/May). A spring application of the 2,4DES mixture may be worth while just before flowering, especially if perennial thistles are present. This spray must be applied before the thistles are through the soil surface in order to ensure best effects. Temporary yellowing of the leaf margin of the strawberries may occur but this has no significant effect on the crop.

Vegetable (Seeded) Crops

Experience with contact pre-emergence herbicides (e.g. PCP or cresylic acid) in seeded crops like onions, beetroot, etc., has shown that in very light soils subject to heavy rain-storms, the germination of the crop may be affected adversely. The safety margin may not only be reduced by such uncontrollable natural factors but it is known also from experience with fruit-tree sprays and fly-sprays that the type of formulation may also materially affect the potency of agricultural

chemicals, including herbicides. Therefore, several factors must be considered in deciding on the proper formulation. The grower on his part, can increase the safety margin for the crop by deeper drilling of the seed, or by light rolling of the soil to compact it, and reduce the chances of sudden rain-storms washing the herbicides into the seed zone. Carrots, onions, peas, broad beans, lettuce and potatoes have been successfully weeded by applying CIPC mixtures immediately after drilling. 2,4DES must not be used pre-emergence on any seeded crop nor on transplants of the following: lettuce, brassicas, onions and celery.

Flowers

There is little information as yet on seeded flowers but there are indications that combinations will be found for these. Tubers, bulbs and corms of dahlias, gladiolus, narcissus, etc., can be weeded by immediate post-planting applications of CIPC or 2,4DES mixtures.

CONCLUSION

Growers new to these very interesting compounds should proceed very carefully until sure that the technique of application has been mastered. It is essential to use efficient apparatus to apply the materials accurately on precise areas. Never practise on valuable crops on a large scale, and use only at half-strength dosage rates until results are seen to be satisfactory. These residual herbicides should be treated as being as potent as highly concentrated fertilizers which in the right hands can provide considerable savings in labour, but if misused might cause severe damage. The grower should never succumb to the temptation to use double dosage "because it is a weedy piece". Rather should he use half the recommended dose twice as often as normal.

ACKNOWLEDGMENTS

Our chairman, MR. HAROLD HILLIER, has contributed very greatly to the successful development of residual herbicides in the nursery by co-operating with me in a long programme of continuous development work.

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NOTES FROM FELLOWS

Saint Fiaker

(*Called by the French "St. Fiacre", and anciently, "Fefre"*)

I AM unable to understand why St. Fiacre, Patron Saint of the gardeners, has been neglected for so long in England; in fact, few people seem to know of his existence. Pan, I find, is generally regarded as the romantic spirit of the flowers and the forests, while St. Francis

of Assisi seems somehow to be linked up with gardening although we have our own patron saint, whose memory was revered in France for the best part of a century.

The reason for this may be because St. Fiacre is seldom depicted in sculpture or painting, as during extensive travels I have only come across two figures of him, one of which stood centrally in the cloisters of a church in Southern France, and the other which I managed to purchase about thirty years ago. It suggests craftsmanship of the Ile de France, about three feet high, and polychromed in black and white, with the exception of the face and hands and some red on the outside of the book. (Fig. 54.)

The monastic garments, of course, do not represent those in which our gardening saint would have been clad, as costumes in early works of art, when depicting previous events, resembled those contemporary with the date of its execution.

St. Fiacre was of noble birth, the eldest son of a Scottish king and born in the western isles of Ireland; and although invited by ambassadors to return to Scotland and claim his kingdom he refused, and with a few pious companions sailed to France in quest of solitude. There, in the heart of woodland not far from Meaux, he cleared the ground and made a garden.

In time this remote spot became a sort of hostel for the poor, who came for help and advice, and pilgrims travelled to him from all parts of France—somewhat reminiscent of the pilgrimage to Lourdes today. Anyhow, what little I can find out about him is that his fame must have been considerable to have persisted for so long, because although he died as early as 670 (and was buried in his own garden), his relics were removed to the cathedral of Meaux in 1468—and the date of this small figure is still later, i.e. *circa* 1510. Moreover, he was titular saint of numerous French churches as well as patron saint of the province of Brie.

There was no absence of horticultural science in France, of course, from the twelfth century onwards; the *Mille Fleurs* backgrounds of Gothic tapestry are unique in the history of art, and although this figure was produced long after his death, it is interesting to see that he stands with an open book in his hand, while his left hand rests lightly on his spade as he pensively considers a problem. But at this time, although a book of any kind was rare, it is obvious that one on gardening was in existence not long from the close of the fifteenth century.

MURRAY ADAMS-ACTON

PLANTS AND PROBLEMS—XLVI

Question. I have been given some seeds of the Garden Huckleberry, and I am told they will grow into large bushes, full of fruit, in the course of a few months. Can you please tell me something about this plant, as I do not want to bother with it unless it is really of some value.

Answer. The Garden Huckleberry is an annual plant easily grown from seeds sown in the open ground in April. The plants should be set in rows in well-prepared soil, not less than 2 feet apart each way. In late summer they bear a succession of berries like large black currants, which can be used in pies and preserves.

The Latin name of the Garden Huckleberry is *Solanum nigrum* var. *guineense*, and the species to which it belongs is very variable and of world-wide distribution, frequently as a weed of cultivated land. Other varieties have been grown for their fruits, under the names Morelle, Wonderberry and Sunberry.

A small-berried form of *Solanum nigrum*, known as Black Nightshade, is a common garden weed in the British Isles. As the berries of this form may be unwholesome, care should be taken not to gather them along with those of the Garden Huckleberry.

Confusion may arise from the fact that the name "Huckleberry" properly belongs to *Gaylussacia*, an American Ericaceous genus, and is also erroneously applied to some species of *Vaccinium*.

WISLEY TRIALS, 1958

ANNUAL LOBELIAS

Thirty-two stocks of annual lobelias were received for trial at Wisley in 1958. The trial was sown under glass on February 4, 1958, and the resulting seedlings were pricked off into seed trays on March 10, 1958. The plants were planted out into the open, where they were intended to flower, in rows 15 inches apart, spacing the plants 12 inches apart in the rows, on May 31, 1958.

The trial was inspected by a sub-committee of the Floral Committee A on July 11 and 18, 1958, and on its recommendation the Council has made the following awards to annual lobelias.

The number in brackets after the description of the variety was that under which it was grown in the trial.

TENUIOR COMPACT IMPROVED. (Raised, introduced and sent by Messrs. Watkins & Simpson Ltd., 26–29 Drury Lane, Covent Garden, London, W.C.2.) **F.C.C.** July 18, 1958, as a variety for cultivation under glass. Plant 10 to 13 inches high, 8 to 9 inches spread, erect habit; flowers 1½ inches diameter, single, very freely produced, Lobelia Blue (H.C.C. 41),

eye small, white. This stock was pricked off into 5-inch pots and flowered under glass. [32]

CRYSTAL PALACE. (Sent by Messrs. D. T. Brown & Co. Ltd., Premier Seed Warehouse, Poulton-le-Fylde, Lancashire.) **A.M.** July 11, 1958. Plant 6 to 8 inches high, 7 to 9 inches spread, compact habit; flowers $\frac{7}{10}$ inch diameter, single, a slightly deeper shade of Lobelia Blue (H.C.C. 41). [20]

CRYSTAL PALACE IMPROVED. (Raised, introduced and sent by Messrs. Watkins & Simpson Ltd.) **A.M.** July 11, 1958. Plant 6½ to 7½ inches high, 7 to 10 inches spread, compact habit; flowers $\frac{7}{10}$ inch diameter, single, Lobelia Blue (H.C.C. 41). [23]

EMPEROR WILLIAM. (Raised and sent by Messrs. Waller Flowerseed Co., Guadalupe, California, U.S.A.) **A.M.** July 11, 1958. Plant 8 inches high, 10 to 13 inches spread, fairly compact habit; flowers $\frac{1}{2}$ inch diameter, single, Cornflower Blue (H.C.C. 742/1). [7]

MRS. CLIBRAN IMPROVED. (Raised, introduced and sent by Messrs. Watkins & Simpson Ltd.) **A.M.** July 18, 1958. Plant 7½ inches high, 7 to 9 inches spread, compact habit; flowers $\frac{3}{5}$ inch diameter, single, a colour near Moorish Blue. (H.C.C. 739), eye conspicuous, white. [16]

PORT WINE. (Raised, introduced and sent by Messrs. Samuel Dobie & Son Ltd., 11 Grosvenor Street, Chester.) **A.M.** July 11, 1958. Plant 5 to 6 inches high, 8 to 9 inches spread, compact habit; flowers $\frac{7}{10}$ inch diameter, single, Violet Purple (H.C.C. 733/1). [29]

BLUE CARPET. (Raised, introduced and sent by Messrs. L. Clause, S.A., Bretigny-sur-Orge, France.) **H.C.** July 18, 1958. Plant 7 to 8 inches high, 9 inches spread, compact habit; flowers $\frac{7}{10}$ inch diameter, single, Cornflower Blue (H.C.C. 742/2). [11]

BLUE GOWN. (Raised, introduced and sent by Messrs. Watkins & Simpson Ltd.) **H.C.** July 18, 1958. Plant 6½ inches high, 8 to 10 inches spread, fairly compact habit; flowers $\frac{1}{2}$ inch diameter, single, a colour near Cornflower Blue (H.C.C. 742). [12]

CAMBRIDGE BLUE SELECT. (Raised, introduced and sent by Messrs. Elsoms (Spalding) Ltd., Elsom House, Spalding, Lincs.) **H.C.** July 18, 1958. Plant 6 to 7 inches high, 10 inches spread, fairly compact habit; flowers $\frac{7}{10}$ inch diameter, single, a slightly deeper shade of Flax Blue (H.C.C. 642). [6]

CRIMSON GEM. (Raised, introduced and sent by Messrs. Harrison & Sons (Leicester) Ltd., St. James' Street, Leicester.) **H.C.** July 18, 1958. Plant 6 inches high, 6 to 8 inches spread, compact habit; flowers $\frac{1}{2}$ inch diameter, single, Violet Purple (H.C.C. 733). [25]

CRYSTAL PALACE IMPROVED. (Raised, introduced and sent by Messrs. Hurst & Son, Ltd., Kelvedon House, 60–64 Artillery Lane, London, E.1.) **H.C.** July 11, 1958. Plant 6½ to 7½ inches high, 7½ to 8½ inches spread, compact habit; flowers $\frac{7}{10}$ inch diameter, single, Lobelia Blue (H.C.C. 41). [22]

EMPEROR WILLIAM. (Raised, introduced and sent by Messrs. L. Daehnfeldt Ltd., 75 Vestergade, Odense, Denmark.) **H.C.** July 11, 1958. Plant 8 inches high, 8 to 10 inches spread, compact habit; flowers $\frac{1}{2}$ inch diameter, single, Cornflower Blue (H.C.C. 742/2). [9]

MRS. CLIBRAN RESELECTED. (Raised and introduced by Messrs. Clibrans Ltd., Altrincham, Cheshire, sent by Messrs. D. T. Brown & Co. Ltd.) **H.C.** July 18, 1958. Plant 6 to 7 inches high, 7 to 9 inches spread, very

compact habit; flowers $\frac{7}{10}$ inch diameter, single, Lobelia Blue (H.C.C. 41), eye large, conspicuous, white. [18]

SAPPHIRE. (Raised and introduced by Messrs. Ernst Benary Ltd., Hann-Munden, Germany, sent by Messrs. Watkins & Simpson Ltd.) **H.C.** July 18, 1958. Plant 9 to 12 inches high, 15 to 18 inches spread, loose spreading habit; flowers $\frac{7}{10}$ inch diameter, single, Moorish Blue (H.C.C. 739/1), eye conspicuous, white. [13]

HEMEROCALLIS

The Council has made the following awards to hemerocallis after trial at Wisley, on the recommendation of the Floral Committee A.

The number in brackets after the description of the variety was that under which it was grown in the trial.

MARION VAUGHN. (Raised by Kenneth D. Smith, Esq., Benedict Road, Damegan Hills, Staten Island 4, New York, U.S.A., and sent by H. J. Randall, Esq., C.B.E., Sandilands, Brooklyn Road, Woking, Surrey.) **F.C.C.** July 18, 1958. Described R.H.S. JOURNAL, **82**, 34 (**A.M.** 1956). [37]

EILEEN GARDENER. (Raised by the late Amos Perry, introduced and sent by Messrs. Perry's Hardy Plant Farm, Enfield, Middx.) **A.M.** July 18, 1958. Plant 48 inches high, vigorous, forming dense tufts; foliage 34 inches long, 2 inches wide; flower stems 36 inches long, up to twenty flowers per stem; flower 5 inches diameter, $2\frac{1}{2}$ inches long, Tangerine Orange (H.C.C. 9/1), reddish brown blotch at throat. [7]

FIREDANCE. (Raised by Kenneth D. Smith, Esq., and sent by H. J. Randall, Esq., C.B.E.) **A.M.** July 18, 1958. Plant 40 inches high, vigorous, forming dense tufts; foliage 30 inches long, $1\frac{1}{4}$ inches wide; flower stems 36 inches long, up to thirty flowers per stem; flower $5\frac{1}{2}$ inches diameter, 3 inches long, rich chestnut mahogany, Chinese Yellow (H.C.C. 606) at throat and along midrib. [54]

GREENGOLD. (Raised by Kenneth D. Smith, Esq., and sent by H. J. Randall, Esq., C.B.E.) **A.M.** July 18, 1958. Plant 48 inches high, very vigorous, forming dense tufts; foliage 40 inches long, $1\frac{3}{8}$ inches wide; flower stems 42 inches long, up to twelve flowers per stem; flower 5 inches diameter, $3\frac{1}{2}$ inches long, rich mahogany crimson, Dresden Yellow (H.C.C. 64) at throat, paler yellow streak along midrib. [36]

LOCHINVAR. (Raised by Mr. Taylor, U.S.A., introduced and sent by Messrs. John Waterer, Sons & Crisp Ltd., The Floral Mile, Twyford, Berks.) **A.M.** July 11, 1958. Plant 48 inches high, very vigorous, forming dense tufts; foliage 36 inches long, 1 to $1\frac{1}{4}$ inches wide; flower stems 44 inches long, up to twenty flowers per stem; flower $4\frac{3}{4}$ inches diameter, 4 inches long, Indian Yellow (H.C.C. 6/1) at throat and midrib, remainder overlaid deep mahogany crimson. [29]

PETER CAVE. (Raised and sent by N. Leslie Cave, Esq., Summerlea, Sugden Road, Thames Ditton, Surrey.) **A.M.** July 18, 1958. Plant 48 inches high, vigorous, forming fairly dense tufts; foliage 30 inches long, $1\frac{1}{8}$ inches wide; flower stems 40 inches long, up to twenty-three flowers per stem; flower $5\frac{1}{2}$ to 6 inches diameter, $2\frac{1}{2}$ inches long, a colour near Brick Red (H.C.C. 016/1), veined and shaded purplish crimson, golden yellow at throat. [14]

SPANISH GOLD. (Raised by Kenneth D. Smith, Esq., and sent by H. J. Randall, Esq., C.B.E.) **A.M.** July 18, 1958. Plant 48 inches high, vigorous, forming fairly dense tufts; foliage 30 to 33 inches long, $\frac{5}{8}$ inch wide; flower stems 40 inches long, up to twelve flowers per stem; flower $5\frac{1}{2}$ inches diameter, $3\frac{1}{2}$ inches long, Cadmium Orange (H.C.C. 8/1). [39]

WENTWORTH. (Raised and sent by E. C. Goulton, Esq., Glandwr, Beechenlea Lane, Swanley, Kent.) **A.M.** July 18, 1958. Plant 48 inches high, vigorous, forming dense tufts; foliage 33 inches long, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches wide; flower stems 34 to 36 inches long, up to nineteen flowers per stem; flower 5 inches diameter, 3 inches long, Chinese Yellow (H.C.C. between 606 and 606/1), lightly blotched pale reddish brown. [49]

BURFORD. (Raised and sent by H. J. Randall, Esq., C.B.E.) **H.C.** July 11, 1958. Plant 36 inches high, vigorous, forming dense tufts; foliage 36 inches long, $1\frac{1}{2}$ inches wide; flower stems 30 to 36 inches long, up to twenty flowers per stem; flower 5 inches diameter, $3\frac{1}{2}$ inches long, Saffron Yellow (H.C.C. 7/1). [64]

MARY RANDALL. (Raised by the late Amos Perry, introduced and sent by Messrs. Perry's Hardy Plant Farm.) **H.C.** July 18, 1958. Plant 36 inches high, vigorous, forming slightly spreading tufts; foliage 24 to 28 inches long, 1 to $1\frac{1}{2}$ inches wide; flower stem 28 inches long, up to eighteen flowers per stem; flower 5 inches diameter, $2\frac{3}{4}$ inches long, throat Indian Yellow (H.C.C. 6/1) with light mahogany shading, remainder of flower lightly overlaid with a shade near Spanish Orange (H.C.C. 010/1). [3]

MRS. DAVID HALL. (Raised by Mr. Klaus, U.S.A., and sent by H. J. Randall, Esq., C.B.E.) **H.C.** July 18, 1958. Plant 48 inches high, vigorous, forming dense tufts; foliage 30 inches long, 1 inch wide; flower stems 36 inches long, up to twenty flowers per stem; flower $4\frac{1}{2}$ inches diameter, 2 inches long, Chinese Yellow (H.C.C. 606/1), blotched at throat with Oxblood Red (H.C.C. 00823). [57]

PINK PRELUDE. (Raised and introduced by Mr. Thomas Nesmith, 106 Fairmount Street, Lewell, Massachusetts, U.S.A., and sent by H. J. Randall, Esq., C.B.E.) **H.C.** July 18, 1958. Plant 36 to 40 inches high, vigorous, forming dense tufts; foliage 36 inches long, $1\frac{1}{2}$ inches wide; flower stems 30 inches long, up to twenty-one flowers per stem; flower $5\frac{1}{2}$ inches diameter, 3 inches long, a colour near Jasper Red (H.C.C. 018/2), greenish yellow deep in throat. [38]

ROYAL RUBY. (Raised and introduced by Mr. Thomas Nesmith and sent by H. J. Randall, Esq., C.B.E.) **H.C.** July 11, 1958. Plant 48 inches high, vigorous, forming dense tufts; foliage 30 inches long, 1 inch wide; flower stems 40 inches long, up to twenty flowers per stem; flower $4\frac{3}{4}$ inches diameter, 2 inches long, rich chestnut mahogany veined and shaded purplish red, greenish yellow deep in throat. [27]

SHIPSTON. (Raised and sent by H. J. Randall, Esq., C.B.E.) **H.C.** July 11, 1958. Plant 39 inches high, vigorous, forming dense tufts; foliage 36 inches long, 1 inch wide; flower stems 34 to 36 inches long, up to twenty flowers per stem; flower 5 to $5\frac{1}{2}$ inches diameter, 5 inches long, Cadmium Orange (H.C.C. 8/1). [17]

SUMMERLEA. (Raised and sent by N. Leslie Cave, Esq.) **H.C.** July 18, 1958. Plant 51 inches high, vigorous, forming dense tufts; foliage 36 to 40 inches long, 1 inch wide; flower stems 46 inches long, up to fourteen flowers per stem; flower 6 inches diameter, $3\frac{1}{2}$ inches long, Saffron Yellow (H.C.C. 7/1), overlaid chestnut brown. [12]

THE DOCTOR. (Raised by Mr. Claar, introduced by Mr. O. W. Fay, Wilmette, U.S.A., and sent by H. J. Randall, Esq., C.B.E.) **H.C.** July 18, 1958. Plant 40 inches high, vigorous, forming dense tufts; foliage 36 inches long, 1¼ inches wide; flower stems 30 to 32 inches long, up to fourteen flowers per stem; flower 4½ inches diameter, 2¾ inches long, a deep rich velvety shade near Oxblood Red (H.C.C. 00823), golden yellow in throat. [25]

RHODODENDRONS

The Council of The Royal Horticultural Society has made the following awards to rhododendrons after trial at Wisley on the recommendation of the Rhododendron and Camellia Committee.

The number in brackets after the description of the variety was that under which it was grown in the trial.

A. BEDFORD. (Introduced by the late L. de Rothschild, Esq., sent by Messrs. Walter C. Slocock Ltd., Goldsworth Nursery, Woking, Surrey.) **F.C.C.** June 4, 1958. A hardy hybrid rhododendron. Plant 6 feet high, 6 feet spread; vigorous, upright habit, very free-flowering; leaves 6½ inches long, 2½ inches wide, dark glossy green. Flower truss 6 inches diameter, 6½ inches deep, compact, dome to conical-shaped, fourteen to sixteen flowers per truss; corolla 3¼ inches diameter, 2¼ inches long, funnel-shaped, margins slightly frilled and waved, Cobalt Violet (H.C.C. 634/1) with paler colour in throat, heavy spotting on upper petal at throat maroon. Flowering from May 27, 1958. [746]

BLUE PETER. (Raised and sent by Messrs. John Waterer, Sons & Crisp Ltd., Bagshot, Surrey.) **F.C.C.** May 23, 1958. A hardy hybrid rhododendron. Plant 8 feet high, 12 feet spread; vigorous, upright habit, very free-flowering; leaves 7 inches long, 2¼ inches wide, very dark glossy green. Flower truss 4½ inches diameter, 4½ inches deep, compact, conical-shaped, fifteen flowers per truss; corolla 2¾ inches diameter, 1¾ inches long, fully expanded funnel-shaped, margins frilled, Cobalt Violet (H.C.C. 634/2) at margin fading to almost white at throat, heavy spotting on upper petal at throat maroon, stamens white. Flowering from May 18, 1958 (**A.M.** 1933). [211]

MOUNT EVEREST. (Raised and sent by Messrs. Walter C. Slocock Ltd.) **F.C.C.** May 13, 1958. A hardy hybrid rhododendron. Plant 12 feet high, 9 feet spread; vigorous, very upright habit, very free-flowering; leaves 5 to 5½ inches long, 2¼ inches wide, dark dull green. Flower truss 5½ inches diameter, 5½ inches deep, conical-shaped, ten to twelve flowers per truss; corolla 2¾ inches diameter, 2 inches long, funnel to campanulate-shaped, pure white speckled brown on upper petal at throat, buds white, style conspicuous with yellow tip. Flowering from May 1, 1958 (**A.M.** 1953). [133]

ORANGE BEAUTY. (Sent by Messrs. Knap Hill Nursery Ltd., Lower Knaphill, Woking, Surrey.) **F.C.C.** May 13, 1958. An evergreen azalea. Plant 3 feet high, 5½ feet spread, vigorous, compact, very free-flowering, flowers borne in clusters of three and four; corolla 1⅞ inches diameter, 1¼ inches long, funnel-shaped, Scarlet (H.C.C. between 19/1 and 19/2), spotted deeper colour on upper petal at throat. Flowering from May 5, 1958 (**A.M.** 1945). [543]

AVON. (Raised and sent by The Royal Horticultural Society's Gardens, Wisley, Ripley, Woking, Surrey.) **A.M.** May 23, 1958. A deciduous azalea.

Plant 4 feet high, 3 feet spread, vigorous, compact upright habit, very free-flowering; leaves 2¾ inches long, 1¾ inches wide, medium green. Flower truss 6 inches diameter, 3½ inches deep, compact, dome-shaped, fourteen flowers per truss; corolla 3¼ inches diameter, 2½ inches long, fully expanded funnel-shaped, margins slightly waved, Straw Yellow (H.C.C. 604/1), spotting at throat golden yellow, stamens long, Straw Yellow (H.C.C. 604/1). Flowering from May 19, 1958. [278]

CETEWAYO. (Raised by Messrs. Knap Hill Nursery Ltd. and sent by Messrs. Walter C. Slocock Ltd.) **A.M.** June 4, 1958. A hardy hybrid rhododendron. Plant 5½ feet high, 8 feet spread; vigorous, very free-flowering; leaves 4¼ inches long, 1½ inches wide, medium to dark glossy green. Flower truss 4 inches diameter, 3¾ inches deep, compact, dome-shaped, twelve flowers per truss; corolla 2 inches diameter, 1$\frac{8}{10}$ inches long, campanulate-shaped, margins waved, Beetroot Purple (H.C.C. 830/1) spotted at throat slight amber, buds darker colour almost black. Flowering from May 20, 1958. [703]

FROME. (Raised and sent by The Royal Horticultural Society's Gardens.) **A.M.** June 4, 1958. A deciduous azalea. Plant 4 feet high, 4 feet spread, vigorous, compact upright habit, very free-flowering; leaves 4½ inches long, 2 inches wide, dark glossy green. Flower truss 5 inches diameter, 4 inches deep, compact, dome-shaped, twelve to fourteen flowers per truss; corolla 2¾ inches diameter, 2½ inches long, fully expanded funnel-shaped, margins waved and frilled, Saffron Yellow (H.C.C. 7), overlaid Fire Red (H.C.C. 15/1) in throat, stamens long, golden yellow. Flowering from May 21, 1958. [279]

FURNIVALL'S DAUGHTER. (Raised, introduced and sent by Messrs. Knap Hill Nursery, Ltd.) **A.M.** May 23 1958. A hardy hybrid rhododendron. Described R.H.S. JOURNAL, **82**, p. 445 (**H.C.** 1957). Flowering from May 16, 1958. [207]

GOLDSWORTH PINK. (Raised, introduced and sent by Messrs. Walter C. Slocock Ltd.) **A.M.** May 13, 1958. A hardy hybrid rhododendron. Plant 12 feet high, 10 to 12 feet spread; vigorous, compact upright habit, very free-flowering; leaves 6½ inches long, 2½ inches wide, dark glossy green. Flower truss 7 inches diameter, 7 inches deep, compact, dome-shaped, eleven flowers per truss; corolla 4 inches diameter, 2¾ inches long, fully expanded funnel-shaped, margins wavy and frilled, Solferino Purple (H.C.C. between 26/2 and 26/3) with pale cream blotch on upper petal at throat, buds deeper colour. Flowering from May 9, 1958. [744]

MRS. A. T. DE LA MARE. (Sent by Messrs. Walter C. Slocock Ltd.) **A.M.** May 23, 1958. A hardy hybrid rhododendron. Plant 4½ feet high, 5 feet spread; vigorous, upright compact habit, very free-flowering; leaves 5½ inches long, 2 inches wide, medium dull green. Flower truss 8 inches diameter, 7½ inches deep, dome-shaped, twelve to fourteen flowers per truss; corolla 3½ inches diameter, 2½ inches long, fully expanded funnel-shaped, margins waved, white, spotting on upper petal at throat greenish-yellow, buds tinged pink. Flowering from May 14, 1958. [100]

MRS. DAVIES EVANS. (Raised and sent by Messrs. Knap Hill Nursery Ltd.) **A.M.** June 4, 1958. A hardy hybrid rhododendron. Described R.H.S. JOURNAL, **82**, p. 446. (**H.C.** 1957). Flowering from May 23, 1958. [380]

MUCRONATUM. (Sent by Messrs. Knap Hill Nursery Ltd.) **A.M.** May 23, 1958. An evergreen azalea. Plant 3 feet high, 5 feet spread, vigorous, spreading habit, very free-flowering, flowers borne in pairs; corolla 2½ inches

diameter, 1¾ inches long, funnel-shaped, margins slightly waved, white lightly spotted amber, stamens white. Flowering from May 18, 1958. [694]

PORT KNAP. (Sent by Messrs. Knap Hill Nursery, Ltd.) **A.M.** May 13 1958. An evergreen azalea. Plant 3 feet high, 5 feet spread, vigorous, spreading habit, free-flowering, flowers borne in threes; corolla ⅞ inch diameter, ⅝ inch long, funnel-shaped, Phlox Purple (H.C.C. 632/1), fine spotting on upper petal at throat crimson. Flowering from May 3, 1958. [584]

RYDE HERON. (Sent by Messrs. Knap Hill Nursery Ltd.) **A.M.** June 25, 1958. An evergreen azalea. Plant 2½ feet high, 5 feet spread, vigorous, spreading habit, very free-flowering, flowers borne singly and in pairs; corolla 2½ inches diameter, 1¾ inches long, funnel-shaped, Rose Bengal (H.C.C. 25/2), spotted Rose Bengal (H.C.C. 25) at throat. Flowering from June 19, 1958. [701]

STOUR. (Raised and sent by The Royal Horticultural Society's Gardens.) **A.M.** June 4, 1958. A deciduous azalea. Plant 4½ feet high, 5 feet spread, vigorous, compact upright habit, very free-flowering; leaves 4 inches long, 1½ inches wide, medium glossy green slightly tinged bronze. Flower truss 5½ inches diameter, 4 inches deep, compact, dome-shaped, thirteen flowers per truss; corolla 2¾ inches diameter, 2¼ inches long, fully expanded funnel-shaped, margins wavy, Mandarin Red (H.C.C. 17/1), upper petal at throat blotched Tangerine Orange (H.C.C. 9). Flowering from May 18, 1958. [280]

THAMES. (Raised and sent by The Royal Horticultural Society's Gardens.) **A.M.** June 4, 1958. A deciduous azalea. Described R.H.S. JOURNAL, **81,** p. 458 (**H.C.** 1956). Flowering from May 15, 1958. [131]

TRENT. (Raised and sent by The Royal Horticultural Society's Gardens.) **A.M.** May 23, 1958. A deciduous azalea. Plant 3 feet high, 5 feet spread, vigorous, compact slightly spreading habit, very free-flowering; leaves 3½ inches long, 1½ inches wide, medium green slightly tinged reddish-bronze. Flower truss 5½ inches diameter, 3 inches deep, compact, dome-shaped, ten flowers per truss, corolla 3 inches diameter, 2½ inches long, funnel-shaped, margins waved, Chrome Yellow (H.C.C. 605/1), tinged Salmon (H.C.C. 412) at margins, spotting at throat golden yellow. Flowering from May 16, 1958. [141]

WONDERLAND. (Raised and sent by Messrs. Walter C. Slocock Ltd.) **A.M.** June 25, 1958. A hardy hybrid rhododendron. Plant 12 feet high, 14 feet spread; vigorous, very free-flowering; leaves 7 inches long, 2½ inches wide, dark green. Flower truss 7 inches diameter, 6½ inches deep, compact, flattened dome-shaped, twelve flowers per truss; corolla 3½ inches diameter, 2¾ inches long, fully expanded funnel-shaped, margins waved and frilled, white, light spotting at throat mustard, buds creamy pink. Flowering from June 17, 1958. [367]

GOLDEN SUNSET. (Raised by the late L. de Rothschild, Esq., introduced and sent by Messrs. John Waterer, Sons & Crisp Ltd.) **H.C.** June 4, 1958. A deciduous azalea. Plant 3 feet high, 4 feet spread, vigorous, compact slightly spreading habit, very free-flowering; leaves 4 inches long, 1¾ inches wide, light to medium green slightly tinged bronze. Flower truss 5½ inches diameter, 5 inches deep, compact, dome-shaped, ten flowers per truss; corolla 3½ inches diameter, 2½ inches long, fully expanded funnel-shaped, margins waved, Straw Yellow (H.C.C. 604), tinged Fire Red (H.C.C. 15/3) and heavily blotched Saffron Yellow (H.C.C. 7), stamens long, pale yellow. Flowering from May 26, 1958. [968]

Awards were also given to the following rhododendrons growing in The Royal Horticultural Society's collection of plants at Wisley.

CORNEILLE. A.M. May 23, 1958. A deciduous azalea. Plant 4 feet high, 4 feet spread, vigorous, compact slightly spreading habit, very free-flowering; leaves 1¾ to 2 inches long, ¾ inch wide, medium green. Flower truss 3¾ inches diameter, 2 inches deep, compact, dome-shaped, eight to ten flowers per truss; corolla hose-in-hose, 1½ inches diameter, 1⅜ inches long, funnel-shaped, margins frilled, Carmine Rose (H.C.C. 621/3) with outer petals deepening at margin to Carmine Rose (H.C.C. 621/1).

SIR WILLIAM LAWRENCE. A.M. May 13, 1958. An evergreen azalea. Plant 4 feet high, 3 feet spread, vigorous, erect upright habit, very free-flowering, flowers borne mainly in pairs with some threes; corolla 1¾ inches diameter, 1¾ inches long, fully expanded funnel-shaped, a glowing shade of Solferino Purple (H.C.C. between 26/1 and 26/2), fine spotting on upper petal at throat maroon.

FELLOWS WISHING TO OBTAIN PLANTS RARE IN CULTIVATION

IN response to the notice published on assistance in obtaining plants rare in cultivation, on page 4 of the January issue of the JOURNAL, the following requests are published. Will any fellow who is willing to offer one of these plants please communicate direct with the Fellow who is seeking it and *not* with the Editor.

Dentaria pinnata, *D. bulbifera* and *D. pentaphylla*, *Magnolia ashei*, *Corallodiscus* (*Didissandra*) *lanuginosus* and *C. kingianus*, *Comptonia asplenifolia*, *Helleborus lividus*, *H. guttatus* and *H. odorus*, *Myrica cerifera*	Mrs. Frazer Mackie, Guincho, Helen's Bay, Co. Down, Northern Ireland.
Helleborus antiquorum, *H. luteus grandiflorus*, *H. cyclophyllus*, *H. guttatus*, *H. odorus*, *H. dumetorum*, *H. pinnatifidus*, *H. purpurascens*	J. Erle-Drax, Esq., Bilting House, near Ashford, Kent.
Vallea stipularis var. *pyrifolia*, *Jasminum angulare*, *Paulownia fortunei*, *Buddleia crispa*, *Thunbergia grandiflora*, *Antigonon leptopus*, *A. pyrifolia*, *Allamanda cathartica* var. *hendersoni*	Sir Ralph Newman, Bart., Blackpool, Dartmouth, Devon.
Colchicum luteum, *Papaver orientale* 'The Bishop', Paeony 'Balliol'	F. Sowels, Esq., The Rookery, Thetford, Norfolk.
Hepatica, double white	G. T. French, Esq., The Friary, Maldon, Essex.
Veratrum album	Mrs. R. Martin, Old Chapel House, Kingussie, Inverness-shire.
Sansevieria cylindrica, *Veratrum viride* and *V. nigrum*	J. Hartley, Esq., Wincherries, The Avenue, Lymm, Cheshire.

Iris kolpakowskyana, *Colchicum crociflorum*

Mandragora officinarum, *Campanula persicifolia* blue form, *Bergenia*, variegated, *Vinca minor* double white, Double green primrose (not foliaceous), Double primrose 'Buxton's Blue'

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Mrs. Margery Fish, East Lambrook Manor, South Petherton, Somerset.

BOOK NOTES

"Garden Design." By Sylvia Crowe. 229 pp. Illus. (Country Life.) 52*s.* 6*d.*

This is altogether a most notable book. It is so replete with information, close in reasoning, and penetrating in analysis, that it is difficult in a short review to give any real idea of its scope, or of its author's great learning and art.

Miss Sylvia Crowe is a writer of deep perception. She explains the principles of garden design in a historical section illustrating how these have been expressed from the earliest times. She shows how her art has evolved organically through the interplay of the physical character and social conditions of the various countries and ages renowned for their gardens. Thus she describes and analyses some of the most famous gardens of the world, the early ones of Spain and Italy, those in the French tradition and then the English garden itself.

Different people, of course, look upon a garden in different ways; some as an agreeable place to be in; others as somewhere to grow plants. The cultivation to perfection of individual plants is the particular British manifestation of the garden art, at least in the last half-century or so. Therefore great interest attaches to Miss Crowe's section on Hidcote, for, as she writes, "the influx of new plant material . . . encouraged the love of growing and collecting plants for their own sakes. In catering for this new class of plant enthusiast gardens had to serve a new function." Miss Crowe then goes on to illustrate how the naturalistic garden, which gives plantsmen so much pleasure, has been woven into the classical tradition of garden design.

There is also a most interesting account of contemporary garden design in Scandinavia and in North and South America. Of the modern Scandinavian gardens Miss Crowe writes that "Historically they are important because they set a standard of attainable excellence for the small and modest garden". Of the gardens of North America and Brazil I cannot forbear to quote again, for Miss Crowe's last phrases on this subject seem to me to sum up the fundamental ideas of garden design: "The organic pattern is organized back into formal shapes. No longer is there the geometrical shape of the classic tradition, but the free, flowing shapes of abstract painting. This process of relating first the classic pattern to the organic world, and then reimposing a formalized pattern is in tune with the eternal struggle of the artist to relate the physical world to the conception of men's minds."

But the book is not all theoretical. A considerable part of it is devoted to the practical problems of the design of gardens for various purposes, of which Miss Crowe has obvious and profound knowledge. She provides an admirable chapter on plant material. Anyone who wishes to place his plants to best effect must learn something from this book. It is impossible that those whose business in life is garden design can do without it. The numerous illustrations match its high standard and it is to be regretted only that this distinguished writer and artist has not included more examples of her own work among them.

MORTON

"Modern Shrubs." By E. H. M. Cox and P. A. Cox. 8vo. 220 pp. Illus. (Nelson.) 25*s.*

Readers of this JOURNAL will remember Lord Digby's review, in 1956, of the admirable "Modern Rhododendrons", by Mr. E. H. M. Cox and his son, Mr. P. A. Cox. The volume under review is a companion to it and shares all its virtues. Indeed, it impresses me as one of the best books on flowering shrubs that I have ever seen, and easily the best of the smaller ones.

Having regard to the vast quantity of material now available for planting, the authors' object has been "to try and help those gardeners who are becoming interested

in flowering shrubs and wish to make a choice of plants which will suit their locality and the size of their gardens". They accomplish this by drawing on their own great experience of the shrubs they have themselves grown in the by no means genial climate of East Perthshire and have observed in other gardens in most parts of this island. "Modern", as used in the title, means only that they consider the shrubs they mention as worthy of being planted in a modern garden of today. These are set out in a section entitled, "Shrubs in their Genera", and they say that in selecting them they have stuck to their own likes and dislikes rather than give long lists from catalogues and text-books. Their choice and description of shrubs is impeccable and it is this which gives the book so much of its character and value. There are, of course, also, valuable sections on cultivation and propagation and the book carries so much learning so lightly that, apart from the instruction it offers, it will surely be read for pleasure alone by anyone interested in its subject. I only wonder whether the authors are not a trifle pessimistic as to the hardiness of some of the plants they mention. For example, I have seen *Mahonia lomariifolia* flourishing in conditions far less favourable than they suggest it requires.

The book is illustrated with coloured plates and line drawings by Miss Margaret Stones, of the skill and distinction that we have become accustomed to expect from her work. The coloured frontispiece of *Eucryphia glutinosa* is surely the finest example of the art of botanical illustration that has ever graced an inexpensive gardening book. I only wish that publishers of books with coloured illustrations would record in them the method of colour reproduction, which here seems very good, employed. This is already done in each volume of the *Botanical Magazine* and would save historians of this art much labour in the future.

At twenty-five shillings this is a low-priced book. I have said enough to indicate the excellence of its contents. Its format is pleasing, paper good, typography clear and well designed. Altogether, a model of what such a book should be.

MORTON

"Garden Plants in Colour." By A. G. L. Hellyer. Cr. 4to. 128 pp. Illus. (Collingridge.) 25*s*.

Plant portraits are so valuable to the beginner in horticulture that this book is to be welcomed, even if many of the drawings are taken from material, little sprigs and snippets, which does not give a characteristic impression of the plants they are intended to depict. Some of the drawings of other plants do not seem to me quite to have caught the likeness of their subjects, and I cannot feel that the artist has been faithfully served by the colour reproduction process. The marginal illustrations, in line by G. R. Kingbourn, appear to have become unduly formalized by having had to conform to limitations placed upon them by the dimensions of the block from which they have been printed, though they often make distinctly agreeable patterns. Nevertheless, assisted by Mr. Hellyer's text, the beginner should be able to derive very fair impressions of many of the plants herein portrayed. I must add, however, that I consider it doubtful that *Dracaena*, *Eucomis*, *Euphorbia fulgens*, *Eucharis*, *Gloriosa*, *Tibouchina* and others, as well as various tender orchids, should be included in a volume entitled "Garden Plants in Colour".

MORTON

"Plant Breeding and Cytogenetics." By Fred C. Elliott. (McGraw-Hill Book Company Inc., New York, Toronto, London.) 1958. 395 pp. 66*s*.

Plant breeding on scientific lines is now of considerable importance in horticulture. It must always be a matter of pride to horticulturists that modern genetics was founded on Mendel's classical experiments with the common garden pea. Botanists gladly acknowledge the contributions of gardeners to our knowledge of heredity; zoologists are envious. Since the rediscovery of Mendel's work, in 1900, and the speedy recognition of its fundamental importance, the subject of this book—research in plant breeding and cytogenetics—has increased at a greater rate than has research in any other branch of botany, and is still increasing. While many of the original principles remain valid there have been additions and extensions which have added to the complexity of the subject and the difficulties of students are made greater by the scattered nature of publications in a very large number of journals, a high proportion of which are not readily accessible. There is thus a definite need for fairly frequent publication of up-to-date text-books dealing with plant genetics.

The book under notice here brings together a great deal of recent research. A particularly valuable feature is the giving of a large number of full references at the end

of every chapter. Many parts may be considered difficult to understand fully by a large number of horticulturists, while in some places there is rather a mixture of elementary and advanced subject matter. A glossary of technical terms would have been useful. Most of the illustrations are apposite and clearly reproduced and there is a satisfactory index. By linking genetical findings to wider aspects of plant life the author to a considerable extent avoids the isolation of cytogenetics from pure and applied botany as a whole, a kind of divorce that is apparent in some cytogenetical publications.

The ground covered in this work is wide though the central theme of breeding for crop improvement is kept well in the foreground. The nature of crop varieties is considered in a general introductory manner. The modern advances in plant cytology and their application, or possible application, to the problems of plant breeding are given in some detail and in the chapters devoted to the behaviour of chromosomes the significance of recombination, the role of mutations, and the vagaries of polyploidy, there is much that is new—and some stiff reading.

What might be termed the practical or applied matters are dealt with in a series of chapters commencing with "The function of introduction in plant breeding". There follow accounts of methods for improving both self-fertilizing and cross-fertilized crops and breeding for disease resistance. The complexities and difficulties met with by the research worker in his attempts to raise the standard of cultivated crops is particularly emphasized in the account of breeding for resistance to the numerous, and often changing, diseases and pests that are the bane of gardeners, farmers, and foresters. The need for maintaining the high level of varieties produced by the plant breeder is clearly indicated in two chapters dealing with the testing of plant materials before release as varieties, and their handling after release. It would appear that, on paper at least, these matters of practical politics are more advanced in the United States than they are in this country.

Though this book is more concerned with farm crops than with horticultural plants, especially those grown for aesthetic purposes as in the flower garden, there is much of interest to the gardener who wishes to understand more of the ways in which new varieties are being produced by methods of controlled breeding. There is no hard-and-fast line between horticulture and agriculture, especially in the cultivation of vegetables and fruits, and one of the prominent features of genetics is that it oversteps our artificial boundaries between so-called different "sciences" whether they be pure or applied.

W. B. TURRILL

"British Wild Flowers." By Patricia Lewis. 356 pp. Illus. "British Trees and Shrubs." By R. D. Meikle. 236 pp. Illus. Kew Series (Eyre and Spottiswoode, 1958.) 25*s*. each.

The publication of "The Kew Series" of five volumes designed to provide "An authoritative, highly detailed, and systematic guide to our native, naturalized and cultivated plants" was announced recently, and the first two volumes, *British Wild Flowers*, by Patricia Lewis, and *British Trees and Shrubs*, by R. D. Meikle, have now appeared. Both volumes are fully illustrated with specially prepared coloured and black and white drawings, and are very attractively produced. Between them they cover a full selection of our native and naturalized woody and herbaceous flora, including the rushes, but excluding the grasses and sedges. Each has an introductory section on classification and nomenclature, a key to the genera, a glossary, and a brief bibliography. The absence of C. E. Hubbard's book on British grasses from the latter is difficult to explain, especially as the family is not dealt with in the text.

The descriptions and other information given under each species are, on the whole, well done, and the books should be useful to those taking up the serious study of our flora for the first time. One cannot help wondering, however, whether, in view of the present plethora of books on the British flora, from Clapham, Tutin and Warburg, and Fitter and McClintock "downwards", there is really a wide public for yet others on the lines of the present volumes. The remaining three books planned in the series are on seaweeds, garden shrubs and trees, and ferns and mosses.

J. S. L. GILMOUR

"The Fundamentals of Gardening." The Ullswater Library of Gardening. Edited by W. E. Shewell-Cooper. Large royal 8vo. 304 pp. Illus. (Seeley Service.) 25*s*.

This is the first volume to appear of an ambitious series planned by the late Lord Ullswater, Mr. Eric Parker, Mr. Tom Hay, and Miss Eleanour Sinclair Rohde, all of

whom have been dead for some years as have also been several of the contributors such as Mr. Fox Wilson and Sir Albert Howard. So, as a volume, it has been long in maturation. However, the principles of horticulture have not changed much, although some of the practice has in recent years, and the book still contains in most of its sections good sound advice and in these days of inflation is good value for money. The soil is dealt with in four chapters by Sir Bernard Keen and Sir John Russell, there are two on compost by Sir Albert Howard, and five on methods of propagation by Mr. F. P. Knight, which form one of the most valuable parts of the book. Mr. W. Dallimore writes on pruning, Mr. R. B. Dawson on lawns, Mr. G. C. Taylor on gates and fences, and Mr. D. E. Green and Mr. Fox Wilson on plant pests and diseases. The editor of the book has filled in some of the gaps, but according to the plan for the series this book deals with ways and means and principles only and so there is nothing on the selection of plants, on annual or herbaceous perennials in particular, or on rock gardens and alpines.

PATRICK M. SYNGE

"Even More for your Garden." By V. Sackville-West. Demy 8vo. 199 pp. Illus. (Michael Joseph.) 18*s*.

Many of the readers of the *Observer* will undoubtedly welcome again reading a section from Miss Sackville West's short articles published here in chronological order throughout the seasons. They will also find useful addresses of nurserymen from whom a number of the plants mentioned can be obtained; while those who have missed reading them on their original appearance will find them even easier to read in book form. There are many useful hints on choice plants throughout the book, while the reproduction as a frontispiece of Sir William Nicholson's famous picture of Miss Jekyll's boots indicates rather charmingly that the articles are "down to earth" as well. There is a short but useful index of plants mentioned, printed rather unusually at the beginning. The advice given is usually very sound, though in one of the articles on propagation she states that camellias will not root from cuttings and this is not so, the majority, except *C. reticulata*, root easily, especially varieties of *C.* × *williamsii* and *C. japonica*.

PATRICK M. SYNGE

"An All the Year Garden." By Margery Fish. Demy 8vo. 144 pp. Illus. (Collingridge.) 21*s*.

In this book Mrs. Fish rightly lays emphasis on the plants with fine foliage that are of decorative value for the greater part of the year, plants with silver foliage that provide an emphasis at a particular point in the garden, and plants such as the *Geranium* species that have a long flowering period. It is probably a plant connoisseur's book, but for many gardeners it will be both interesting and stimulating. In that respect it is the best kind of gardening book, one based on personal experience and consideration, and her recommendations are generally sound while her discursive and personal style makes very easy reading. The book is well illustrated with excellent photographs of the plants she mentions.

PATRICK M. SYNGE

"Dartington Hall." The History of an Experiment, by Victor Bonham-Carter, with an Account of the School, by W. B. Curry. Demy 8vo. 224 pp. Illus. (Phoenix House.) 30*s*.

The gardens at Dartington Hall have already been described in this JOURNAL by Percy Cane (79, pp. 246–56) and for horticulturists this book adds nothing to the previously published account. Undoubtedly the whole conception of Dartington Hall, and its very varied aims, experiments and achievements should produce material for many books of the greatest interest for all interested in the life of the countryside. This one has attempted to compress and condense all that material into one volume and has been written by an apparently detached outside observer. In the result the book seems to have missed all the excitement, the enthusiasm and the personal touches that must have gone into the building up of such a community. It only really comes to life with Mr. Curry's account of the School which was largely his personal creation and this was for your reviewer by far the most interesting part of the book.

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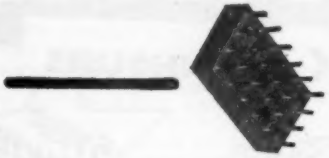

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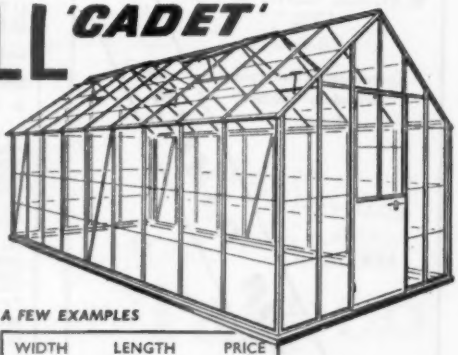

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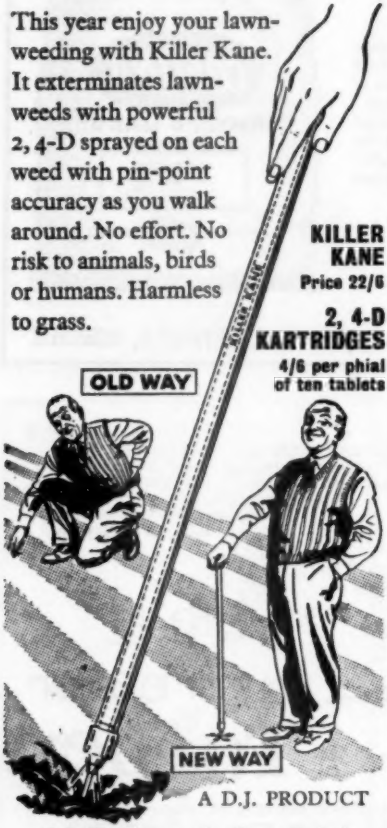

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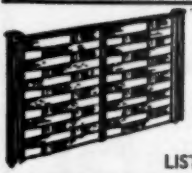

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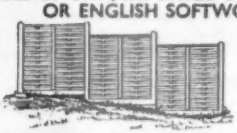

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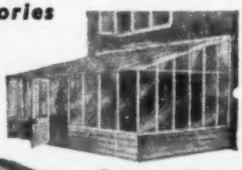

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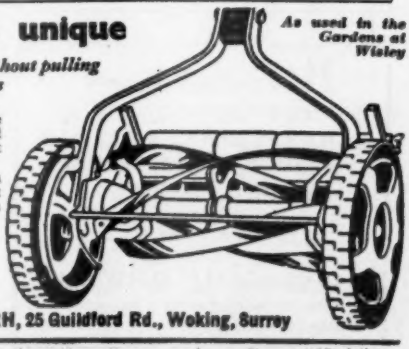

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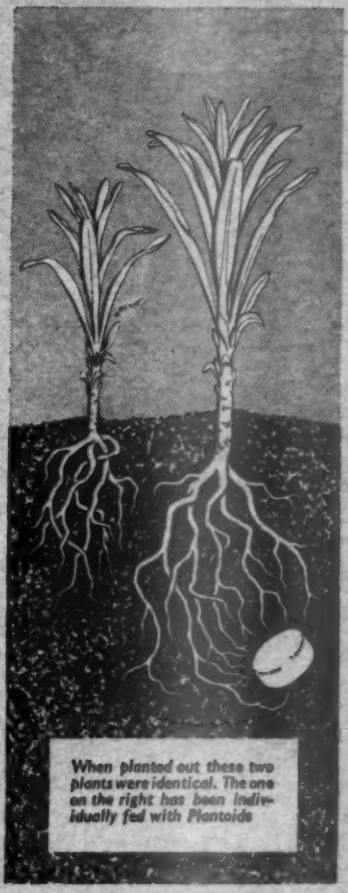

When planted out these two plants were identical. The one on the right has been individually fed with Plantoids

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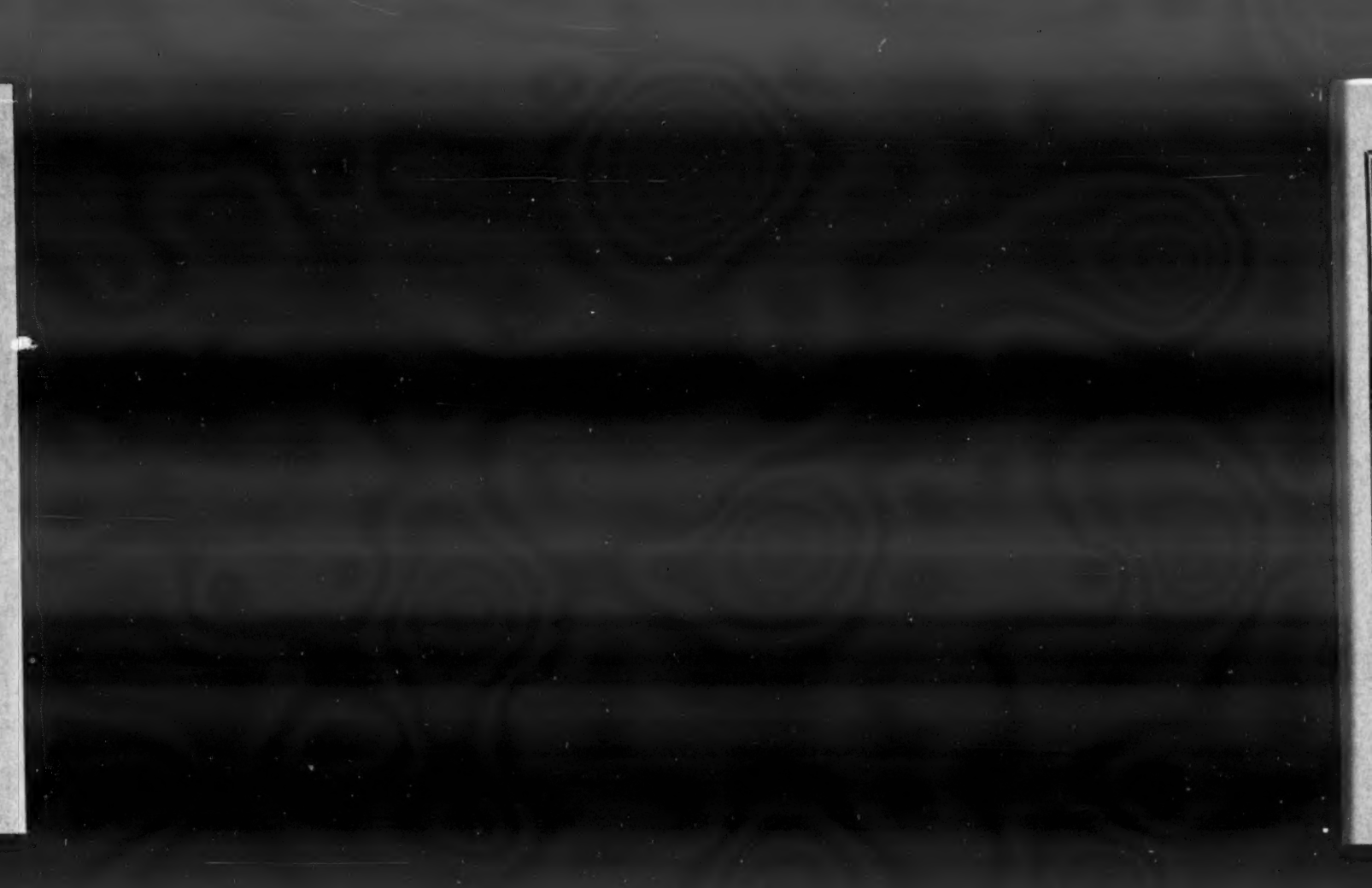
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